Thd. Farquha

A
DESCRIPTION
OF THE
HUMAN EYE.

A DESCRIPTION

John Spence

OF THE HUMAN EYE,

AND ITS ADJACENT PARTS;

TOGETHER WITH THEIR PRINCIPAL DISEASES,

AND THE METHODS propoſed for relieving them.

C

By JOSEPH WARNER, F.R.S.
And Senior Surgeon to Guy's Hoſpital.

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TO

Dr. HENRY HINCKLEY,

Dr. ROBERT THOMLINSON,

Dr. WILLIAM SAUNDERS,

Mr. LEWIS WAY,

AND

Mr. JAMES FRANCK,

The preſent Phyſicians and Surgeons of
Guy's Hoſpital;

Men of approved Abilities, and acknowledged
Integrity in their Profeſſions;

This ſmall Treatiſe, the Work of his leiſure
Hours, is faithfully inſcribed, by

Their moſt obedient Servant,

And reſpectful Friend and Aſſociate,

JOSEPH WARNER.

Hatton-Street.

PREFACE.

THE following Treatiſe is intended for the information and improvement of thoſe young gentlemen in the profeſſions of Phyſic and Surgery, whoſe ages and employments have not yet furniſhed them with ſufficient opportunities of acquiring ſuch a degree of knowledge, as long experience in private practice, and the advantages of many years attendance upon an hoſpital, are capable of affording.

Should the ſmall work, I now venture to introduce into public, upon a ſubject ſo intereſting to mankind as that of the Eye, prove inſtructive to the younger Practitioners, and uſeful to their Patients, I ſhall think myſelf happy, and ſufficiently rewarded for the pains I have been at.

From this undertaking I have no ſelf-intereſted views; and therefore think it unneceſſary to apologize.

The art of explaining myſelf upon ſo delicate a ſubject as the Eye, in a conciſe, plain, and intelligible manner, is all I have ſtudied. Whether or not I have effected this, the reader will be the beſt judge.

The whole I have written on the diſeaſes of the Eyes, and their adjacent parts, is the reſult of my own experience, and repeated obſervations; and as ſuch I deliver it to my readers.

To the younger part of the profeſſion I preſume to addreſs myſelf in the following words of Cicero, and I hope with no great impropriety:

"Ne quid falſi dicere audeam—
"Ne quid veri dicere non audeam."

To the more experienced in his profeſſion, whoſe curioſity may ſo far influence, as to induce him to peruſe this Treatiſe, with the greateſt reſpect, and deference due to his ſuperior abilities, and in hopes of exciting to ſomething more uſeful on this ſubject; to ſuch I take the liberty of addreſſing myſelf in the expreſſive language of the great poet of the Auguſtan age:

"——Si quid noviſti rectius iſtis,
"Candidus imperti: ſi non; his utere
"mecum."

P. S. The chapter on the Cataract, and the two different methods recommended for the removal of this diſeaſe; together with a recital of the caſe of W. L. are in ſome meaſure borrowed from the Third Edition of my *Caſes in Surgery*.

This, in juſtice to my former readers, I am conſcious ought to be mentioned: but, at the ſame time, it may be proper, if not neceſſary, to inform them, that, on comparing theſe chapters, it will be diſcovered that I have by no means adhered to a literal tranſcript; but that I have endeavoured to make ſome uſeful additions and obſervations on theſe heads.

In the Account of the Methods uſed for the Extraction of the Cataract, I have been much more explicit than before; to which I have added, and recommended, two inſtruments, to be occaſionally made uſe of for the more ſafe and eaſy execution of this operation.

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CONTENTS.

Page

OF the Globe of the Eye, and its neighbouring Parts - - 1
Of the Supercilia - - - 2
Of the Cilia, and their Diſeaſes, &c. - 3
Of the Palpebræ, and their Diſeaſes, &c. 4
Of the Glandulæ Ciliares, and their Diſeaſes, &c. - - - 11
Of the Puncta Lacrymalia, and their Diſeaſes, &c. - - - 14
Of the Saccus Lacrymalis, and its Diſeaſes 15
Of the Caruncula Lacrymalis - 25
Of the Valvula Semilunaris - 26
Of the Glandula Lacrymalis, and its Diſeaſes - - - - ibid.
Of the Muſcles of the Eye - 29
Of the Optic Nerves, and their Diſeaſes 30

Of

Page
Of the external Coats of the Eye, and their Diſeaſes - - - - 37
Of the Tunica Sclerotica, and Tunica Cornea; and the Diſeaſes of the Cornea 58
Of the internal Coats of the Eye, and the Humors of the Eye - - 64
Of the Cataract - - - 80
A ſhort Account of ſome extraordinary Facts attending the Operation of Couching 86
Of the Operation of Couching - 93
The Operation of extracting the Cataract 100

ERRATA.

P. L.
18, 24, for *furture* read *future*
66, 25, for *suface* read *surface*
82, 3, after *beyond*, dele the *comma*.
89, 24, for *attended to* read *attended too*

DESCRIP-

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DESCRIPTION OF THE HUMAN EYE.

OF THE GLOBE OF THE EYE, AND ITS NEIGHBOURING PARTS.

THE Eyes are ſituated in two deep, ſlippery, and ſmooth cavities, termed Orbits. In the recent ſubject their ſmoothneſs and ſlipperineſs are derived from the Perioſteum and cellular membranes.

The orbits of the eyes are of irregular dimenſions.

In ſhape they are conical, or nearly of that form.

A great part of the fund of each orbit is open for the tranſmiſſion of nerves to the eyes; and for the tranſmiſſion of arteries and

veins

veins to and from the eyes, for the purpoſes of viſion.

The orbits are placed on each ſide the ſuperior and lateral parts of the noſe; and are compoſed of the ſeven following bones: to wit, Os Frontis; Os Sphenoides; Os Ethmoides; Os Maxillare Superius; Os Unguis; Os Malæ; Os Palati.

The parts that are adapted to Viſion, are, by anatomiſts and ſurgeons, in general, treated of under two heads; and by them are diſtinguiſhed, firſt, into thoſe parts that are aiding and aſſiſting in viſion, but which are not concerned in forming the globe of the eye; ſecondly, into thoſe parts that are employed in the texture and compoſition of the globe of the eye, and which are indiſpenſably and immediately neceſſary to ſight.

The parts that are aſſiſting in viſion, are the Supercilia, or eye-brows; the Cilia, or eyelaſhes; the Palpebræ, or eye-lids, together with the muſcles of the Palpebræ: The Glandulæ Sebaceæ of the eye-lids; otherwiſe termed the Ciliary glands, or Meibomius's glands. The Puncta Ciliaria; the Caruncula Lacrymalis; the Valvula Semilunaris; the Puncta Lacrymalia; and the ſix muſcles of the globe of the eye, together with a conſiderable bed of fat, in which they are placed.

SUPERCILIA.

The ſituation of theſe parts, their compoſition and form, are ſo univerſally known, as to render it quite unneceſſary to ſay any thing on this head. To me, indeed, it appears that the eye-brows are rather deſigned by nature as an ornament to the human ſpecies, than to be of uſe in ſight; becauſe the anterior and inferior part of the Os Frontis, from its ſituation, as well as from the prominency of its form, ſeems to be better calculated to divert the ſweat from falling upon the ſurface of the eye, when we uſe ſevere exerciſe or hard labour, and to moderate the rays of light in their paſſage to the eye, than the Supercilia can do; which are the two uſes that are in general aſcribed to theſe parts.—It is obſervable, that the eye-brows are peculiar to the human ſpecies.

CILIA.

Theſe parts are ſo generally known, as to render any deſcription of their ſituation, form, or texture, unneceſſary; their uſes are, to moderate the rays of light in their paſſage to the Cornea; by their frequent motions they aſſiſt in diffuſing the tears, and oily ſecretions of the ſebaceous or ciliary glands of the eye-lids equally over the ſurface of the globe of the eye; which fluids, after having done their office of glazing the tranſparent Cornea, and waſhing away any extraneous bodies that otherwiſe would probably incommode the ſight, are, by the aſſiſtance of the ciliary motions, combined with the farther aſſiſtance of the Caruncula Lacrymalis and Valvula Semilunaris, forwarded through the two Puncta Lacrymalia, into the Saccus Lacrymalis; and from thence through the Ductus ad Naſum into the noſtril. The eye-lids likewiſe ſerve to entangle inſects, that would otherwiſe fly into the eye, and incommode our ſight to a greater degree than we find they are uſually capable of doing, when we ride or walk out in the ſummer ſeaſon.

PALPEBRÆ.

There are, every one knows, two eye-lids, formed by nature to cover and defend each eye; and that they are diſtinguiſhed into the upper and lower eye-lids.

The Palpebræ, or eye-lids, meet together externally and internally: theſe points of union or contact are termed the angles or Canthi of the eye. The inner angle of the eye-lids, near the noſe, is called Canthus Major; the outer angle of the eye-lids, near the temple, is called Canthus Minor. The eye-lids are compoſed of the Cuticle, the Cutis, and the Membrana Adipoſa; their borders, or edges, are of a cartilaginous nature, which cartilages are called Tarſi. The ſhape of the eye-lids is ſomewhat arched; particularly the upper eye-lid. They are both lined with a thin, vaſcular, ſoft, ſmoothly-poliſhed, and ſlippery membrane: this lining is derived from the Tunica Conjunctiva being reflected, after having continued its courſe for ſome ſpace towards the poſterior part of the globe of the eye. From hence we ſee the propriety of endeavouring at the removal of any extraneous body, that accidentally gets into the eye, by drawing the eye-lids forwards over the globe of the eye, or by paſſing a poliſhed probe, or any other ſmooth inſtrument, under the upper and under eye-lid; or by injecting or dropping warm water, warm milk, or any other ſoft liquor, into the eye, and under the eye-lids, with a probable view of giving ſpeedy relief, by removing the cauſe of preſent pain and uneaſineſs: for by means of the Tunica Conjunctiva being thus reflected before it gets more than half way towards the fund of the orbit, the extraneous body can inſinuate itſelf no farther than this coat reaches. The eye-lids are farther compoſed of fleſhy fibres, of conſiderable note, which fibres conſtitute three diſtinct and ſeparate muſcles. Theſe muſcles are known to anatomiſts by the following terms; Orbicularis Palpebrarum; Elevator Palpebræ ſuperioris rectus; Depreſſor Palpebræ inferioris. The Orbicularis Palpebrarum ſurrounds the eye-lids of each eye externally, and ſhuts them up; it is inſerted by a ſmall tendon, near the inner angle of the eye-lids. The Elevator Palpebræ ariſes from the fund of the orbit near the Foramen Opticum, and is inſerted by a tendinous expanſion into the Tarſus of the upper eye-lid. The Depreſſor Palpebræ inferioris is a very thin ſeries of fleſhy fibres, ariſing in ſome ſubjects from the ſkin of the cheek; whilſt in others it ariſes from the Os Malæ, and is inſerted into the lower edge of the orbicular muſcle. The firſt of theſe muſcles is much larger and ſtronger than the other two, and counteracts both of them. The ſecond muſcle lifts up the upper eye-lid, as its name expreſſes. The third muſcle moves the lower eye-lid downwards, from whence it has its name. When the elevator muſcle becomes relaxed, and incapable of action, the upper eye-lid falls down upon the globe, and occaſions deformity, and in a great degree too obſtructs viſion. The beſt remedies I know of, for the relief of this complaint, are cold-bathing, aſtringent cataplaſms applied to the part at bed-time; aſtringent lotions, which may be uſed two or three times a day, or oftener, joined with compreſs and bandage applied to the part in the day-time, aſſiſted by the Cortex Peruvianus, taken as a medicine; which may ſometimes be joined with volatiles, and ſometimes without. But, to ſay the truth, ſince we ſee this muſcle is ſo deeply ſituated, as to be greatly out of the reach of all external applications, bandage excepted, our principal expectations muſt be from bandage, and ſuch internal medicines as are above hinted at, joined with the cold-bath; and more particularly if the tone of the body be generally weakened. The diſeaſes to which the Palpebræ are moſt liable, and which frequently require the aſſiſtance of the ſurgeon, are tumors of different kinds; moſt of which, that attack theſe parts, are of the encyſted ſpecies. Theſe tumors, from their ſituation and ſize, are known to prove frequently ſo troubleſome, by their weight and preſſure upon the eye and eye-lids, as to become a deformity to the face, and to render the motion of the upper eye-lid (which I have found more frequently attacked by theſe ſwellings than the under eye-lids) imperfect as to its elevation. Theſe tumors are ſituated more or leſs deep in different people. Sometimes the baſis of the tumor extends no farther than the external ſurface of the orbicular muſcles; at other times I have found the extent of the baſis of the tumor to be as deeply ſituated as the upper ſurface of the conjunctive coat, which lies beneath the inferior ſurface of the orbicular muſcle.

Sometimes the tumor is moveable by its forming a ſlight adheſion only to the neighbouring parts: whilſt at other times, the tumor, upon enquiry, appears fixed. In the firſt inſtance, the removal of the ſwelling will be much more eaſily effected than in the latter. Theſe tumors may properly be diſtinguiſhed into four kinds; to wit, the Atheroma, the Meliceris, Steatoma, and the

Anomalous Tumor; which laſt term is derived from the mixture and variety of the contents that are found in the inveſting membrane which conſtitutes the Cyſt or bag; from whence theſe tumors are called encyſted. It ought to be remembered, that when we attempt to extirpate a tumor from the eye-lids, or from any other part of the face, that deformity ſhould be avoided as much as poſſible, conſiſtent with the effectual removal of every part of that Cyſt in which the tumor is contained; but at the ſame time it muſt be remembered too, that our delicacy be notcarried to ſuch a length as to make the inciſion ſo ſmall through the integuments, (which muſt be with the courſe of the fibres of the orbicular muſcle) as to diſable us from extirpating every part of the Cyſt: for if we do not attend properly to this maxim, the tumor will probably grow again in a ſhort time, ſo as to require a repetition of the operation, as I have ſometimes known to be the caſe. The inſtruments neceſſary for the purpoſe, are a ſmall round-edged knife; a ſharp-pointed ſmall pair of ſciſſars, and a diſſecting hook. The inſtruments uſed on this occaſion muſt be of the ſharpeſt kind; as the eye-lids are, from the thinneſs of their make, as well as from their flaccidneſs, incapable of making the ſame reſiſtance as any other parts of the face and body, when under the like treatment. This renders the operation rather more tedious and difficult of execution, than when differently circumſtanced: as ſome degree of inflammation is to be expected to ſucceed this operation; and that principally, as I have almoſt always obſerved it to be, on the conjunctive coat, which, under proper management, ſubmits in a few days to the common methods of emollient waſhes, emollient ointments, or cataplaſms uſed to the part twice a day. I need, I think, ſay nothing more on this occaſion, than that abſtinence in diet, for a few days, ſhould be attended to; that the eye ſhould be kept from the light; and that a little gentle phyſic occaſionally be adminiſtered. If ſuch a degree of pain and heat ſhould occur, as to make it adviſeable to procure artificial reſt, the ſaline draughts, joined with the Tinctura Thebaica, in the proportion of ſix or ſeven drops of the latter mixed with each draught, and adminiſtered every ſixth or eighth hour, for one, two, or three days, I cannot but approve of, as I have now and then found ſuch treatment of ſervice. Bleeding I have very ſeldom found neceſſary on this occaſion; but the propriety of this evacuation, as well as of every other method, muſt be determined upon from the degree of the complaints, which greatly depend upon the conſtitution of the patient.

Before I finiſh my remarks on this diſeaſe, I muſt obſerve, relative to the operation, that a ſingle inciſion made through the integuments will ſometimes be found ſufficient; whilſt at other times, it will be found expedient to take out a bit of ſkin, by firſt making two ſmall ſemicircular inciſions, with their horns meeting together at each extent of the wound.

GLANDULÆ CILIARES,

Otherwiſe called Glandulæ Sebaceæ Meibomii, together with their orifices, termed Puncta Ciliaria, are ſituated in regular rows, parallel with the borders or internal edges of the Palpebræ, formed by the Tarſi. The Tarſi are thin cartilages, compoſing the greateſt portion of the edge of each eye-lid; which, from their texture and ſituation, ſeem deſigned by nature to keep the edges of the eye-lids properly ſmooth, and uniformly extended: by this wiſe contrivance the ciliary glands, with their reſpective orifices, or excretory ducts, are preſerved at equal and proper diſtances from each other; and the latter are kept open, to admit of the oily fluid being diſcharged occaſionally through them. The ciliary glands are often attacked with inflammation, enlargement, pain, and impoſthumation, ariſing in different ſubjects from very different cauſes. Sometimes theſe effects are produced from common colds, attended with conſiderable inflammations of the Tunica Conjunctiva. Under theſe circumſtances the complaint gives way to bleeding, purging, and a temporary confinement from the air and light; aſſiſted by emollient fomentations, ſuch as warm cow's milk, or milk mixed with warm ſoft water, warm barley water, warm water-gruel, or warm water alone, or to the ſteams of either of theſe directed to the part, and repeated ſeveral times a day, as may be found neceſſary. Sometimes emollient cataplaſms applied warm to the eye-lids, and occaſionally repeated, joined with purging phyſick adminiſtered at proper intervals of time, will be found expedient. By this treatment the parts become ſoftened, and relaxed; the ciliary Puncta are enlarged, and a diſcharge iſſues through them reſembling matter; which diſcharge ſhould be encouraged till the turgidneſs of the eyelids is removed: then, and not before, if at all neceſſary, aſtringent waſhes, and ointments, may with propriety be uſed to the eyelids and conjunctive coat; or it may without riſque be ſometimes left to the courſe of nature alone, whoſe efforts we ſhall often find, in theſe and many other inſtances, to anſwer the purpoſe moſt effectually. But as theſe glands are often diſeaſed from venereal cauſes, ſcrophulous cauſes, or ſuch as are generally, though perhaps improperly, denominated, ſcorbutic habits of body, we ſhall find that the ſimple methods alone which are above preſcribed, will prove ineffectual; unleſs aſſiſted by proper regimen in diet, joined with alteratives of different kinds, adapted to the nature of the diſeaſe, to wit, Mercurius Dulcis Merc. Calcin. Pil. Plum. the Extractum Cicutæ, alkaline abſorbents, decoctions of the woods prepared in lime water, or common water, decoctions of the Peruvian bark, prepared in the like manner as we have recommended for the woods, or the Peruvian bark in ſubſtance. Two kinds of preparations of the woods are ordered in the London Diſpenſatory, under the appellations of Aqua Calcis magis compoſita, and Aqua Calcis minus compoſita; the efficacy of which may be ſometimes aſſiſted by proper doſes of the Vinum Antimoniale, as occaſion may require; obſerving at all times to prevent coſtiveneſs: and, if neceſſary, to divert the humour from the eyes, by bliſters applied to the neck, head, or betwixt the ſhoulders, which act not only as ſtimulant and evacuants, but as alteratives, by the ſalts of the Cantharides being copiouſly abſorbed into the circulation, and ſpeedily mixing with the maſs of blood, by means of the abſorbent or inhaling veſſels of the Cutis. Iſſues alſo are adviſeable, made by inciſion, or cauſtic.

PUNCTA LACRYMALIA.

Theſe are two ſmall round orifices, ſituated not far from the Canthus Major, or internal angle of the eye-lids, near to the extremities of the Tarſi, and almoſt oppoſite to each other: they open into two diſtinct canals, termed Cornua; by means of theſe canals, or Cornua, the tears and oily ſecretion of the ciliary glands are conveyed into the Lacrymal Sac; and from thence through the Ductus ad Naſum, into the noſtril, after having firſt performed their proper functions upon the ſurface of the eye-ball.

SACCUS LACRYMALIS

Is a perpendicularly oblong bag, of irregular dimenſions, and of a membranous and cellular texture. It is placed in a groove, formed for its reception by the Os Unguis, and the naſal proceſs of the Maxilla ſuperior, within the bony orbit. On its poſterior part the Sac is joined with the Perioſteum that inveſts the Os Unguis, and the bony canal of the ſuperior maxillary proceſs. On the ſurface of the Os Unguis, which is a very thin and brittle bone, there are obſervable ſome ſmall foramina through which the Perioſteum inſinuates itſelf in the form of ſmall fibres; with which fibres are mixed ſome of thoſe belonging to the poſterior ſurface of the Lacrymal Sac. The uſe of the Lacrymal Sac, is to receive the ſuperfluous tears and oily ſecretion of the ciliary glands; and from thence they are, in a ſound and perfect ſtate of theſe parts, conveyed through the Ductus ad Naſum into the noſtril and upper part of the bones that form the roof of the mouth.

When either the Puncta Lacrymalia, or the Saccus Lacrymalis, or the Ductus ad Naſum, or all of them, become wholly obſtructed, the tears, and the oily ſecretion from the Glandulæ Ciliares, cannot find their uſual paſſage or courſe into the noſtril and mouth: for which plain reaſon, theſe fluids muſt flow more or leſs copiouſly, in proportion to the quantity ſecreted, down the cheek on that ſide of the face; and thus they become troubleſome to the patient, as well as unſeemly to thoſe about him.

In this manner the diſeaſe termed Epiphora, or the Watery Eye, is produced.—When the Lacrymal Sac itſelf becomes inflamed, the membranes compoſing this Sac thicken; and if the inflammation and thickneſs of this Sac increaſe to ſo great a degree as to fill up the paſſage, and the diſeaſe cannot be removed by proper evacuations, ſuch as bleeding, purging, and bliſters, aſſiſted by repellent local applications, the inflammation and thickneſs of the Sac terminate in impoſthumation: in conſequence of which, the Sac becomes replete with matter mixed with tears and the ciliary ſecretions; from hence ariſes a diſtenſion, an elevation, and an inflammation of the integuments, as well as of the ſubjacent Sac itſelf, accompanied generally with a good deal of pain. The inflammation is often continued to the neighbouring parts of the Tunica Conjunctiva and Albuginea; and from thence ariſes a temporary weakneſs of ſight. Under theſe circumſtances, matter may in many inſtances be diſcovered to regurgitate involuntarily through the Puncta Lacrymalia, and to lie upon the ſurface of the internal part of the globe of the eye. Upon preſſing the integuments below the Puncta Lacrymalia, the matter iſſues freely through the Puncta. Theſe ſymptoms coming on put the patient under a neceſſity of applying for relief, if that can be had: if not; the inflammation continues growing worſe; the tumor encreaſes, and becomes conſiderably prominent; till at length the ſkin, and ſubjacent fatty membrane being rendered incapable of admitting of any farther diſtenſion, the Cuticle firſt ſeparates from the Cutis by cracking in various parts: ſoon after this, the Cutis and Membrana Adipoſa burſt: a conſiderable quantity of matter runs down the cheek, and continues ſo to do, till the Sac is nearly emptied; the ſore at firſt is large, accompanied often with irregular and ragged lips; the patient now becomes eaſy from the ſtretch of the parts being taken off: the Tumor ſubſides; and oftentimes, through fear; through neglect; or in vain expectation of the wound curing by the efforts of nature alone; the external ſore becomes contracted. It now

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is changed to a circular orifice attended in general with callous edges; which circumſtances and ſymptoms, joined with the depth and hollowneſs of the parts underneath, conſtitute that diſeaſe, which, when ſituated in any part of the body whatſoever, is termed a Fiſtula, or a Fiſtulous ulcer; but when confined to this part, it is univerſally known amongſt the phyſical faculty by the term Fiſtula Lacrymalis: which name is derived from its ſituation, and the parts concerned in this diſeaſe. This malady is ſeldom or ever curable by any other means than by operation, as is ſufficiently known to the experienced ſurgeon. The mode of operating upon this part, muſt be different under different circumſtances: for inſtance, if the Lacrymal Sac and its integuments be diſtended with only a ſmall degree of inflammation, and thinneſs of the ſkin, a ſingle inciſion made with a ſmall ſharp round pointed knife, and carried from the upper to the lower extent of the Tumor quite down into the cavity of the Cyſt, will ſometimes be found ſufficient, for the furture purpoſes of applying proper dreſſings to the bottom of the diſeaſed Sac. Where the ſkin is much lifted up, and is grown thin, and diſcoloured from a large quantity of matter that has long been depoſited and confined in the Sac; or where the integuments have burſt, and are become callous; and the natural colour of them is altered to a mixture of pallidneſs and lividneſs; it will be found expedient in the firſt inſtance to remove an oval piece of the integuments and Sac, by making the inciſions equally long with the diſtended ſkin, and of ſuch a breadth, as will admit of a removal of the greateſt part of the diſeaſed integuments. By theſe means, we ſhall have all the advantages of the proper treatment of an hollow ill-conditioned ſore, that can be obtained by art.

In the ſecond inſtance, the whole of the callous integuments muſt be cut away at the time of operating, to afford us thoſe advantages which we have already mentioned.

The laſt thing, in this operation, to be conſidered is, to judge of the expediency of perforating the Os Unguis. By ſome it is adviſed, that this proceſs of the operation ſhould not be put in execution, when the Os Unguis does not appear to be carious: the true characteriſtic of which is its being diveſted of its Perioſteum. But I muſt diſſent from this opinion, ſince I have ſeveral times learnt from experience, that there is no curing a diſeaſe of this kind, without deſtroying the Os Unguis

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in part, even when that bone is not denuded and carious. I have cured Fiſtulas of this kind by once operating upon the Os Unguis in this manner; which Fiſtulas have for ſeveral years eluded the efforts of repeated inciſions alone, made in an unexceptionable manner, joined with the moſt judicious dreſſings for the purpoſe. I once had a young lady under my management, for a Fiſtula Lacrymalis of ſeven years ſtanding; the cure of which had been attempted by three or four different operations, that were performed without breaking through the Os Unguis. The wounds, as ſhe informed me, had healed outwardly ſeveral times, but did not long continue well. I made inciſions through the integuments in two oppoſite directions, and ſo ſhaped as to admit of my taking away a ſmall oval bit of ſkin; and I afterwards perforated the Os Unguis, and kept the wound open for ſome time: ſhe did well at the end of ſix weeks, and has had no return of her complaint, though twelve or fourteen years are elapſed ſince ſhe was under my care. The neceſſity of breaking through the Os Unguis ariſes from the diſeaſed ſtate of the hind part of the Sac and Perioſteum; which ſo long as both of them, or the Perioſteum alone, continues thickened, will not admit of a good and firm bottom being procured by any other degree of art that I know of. After a perforation is made through the Os Unguis, it is my cuſtom immediately to introduce a ſmall long ſpunge tent through the wound into the noſtril; and I continue the uſe of the tent for ten or twelve days, or longer, as I ſee neceſſary. I always uſe thin, and ſoft injections to waſh away the diſcharge, and to keep the parts clean and open quite into the noſtril, whenever I dreſs the wound, which is generally at firſt neceſſary to be done twice a day. When the opening through the Os Unguis appears ſufficiently confirmed; which I judge it to be, by my being able to introduce into the noſtril a ſmall bougie, or a large ductile probe, without meeting with any reſiſtance; I then uſe ſoft tents of lint, for a week or ten days longer. After the tents are diſcontinued, I dreſs the wound carefully down to the bottom; ſometimes with pledgits of deterſive ointments, ſometimes with dry lint only; obſerving occaſionally to touch the ſprouting and looſe fleſh with the lunar cauſtic, which I have almoſt always obſerved gives leſs pain than the vitriol, and is more effectual. This I continue to do, till I am ſatisfied of there being no more diſcharge from the wound than there ought to be from any other wound of the ſame ſize. When matters are arrived at this ſtate, I dreſs the wound almoſt ſuperficially with lint, or Ceratum Epuloticum ſpread upon lint, till the parts are healed; which, from the firſt of the operation, I have obſerved require five or ſix weeks, and ſometimes a longer time, before the cure can be compleated, dependent upon a variety of circumſtances. After the wound is healed, the tears in ſome will not be any longer troubleſome, by their falling upon the cheek; whilſt, in others, they ſhall continue to be ſo in a ſmall degree.

The Os Unguis is ſo thin, as to require very little force in breaking through it. I have often made a paſſage through this bone into the noſtril with the edge of my inciſion-knife, and in ſo effectual a manner, as not to require the aſſiſtance of any other inſtrument than a large probe or bougie, which I bend and adapt to the ſize and courſe of the orifice, inclining it at the ſame time downwards into the noſtril.

When the perforation is properly made; the cracking of the Os Unguis is ſometimes heard by the operator, and a diſcharge of blood in a ſmall quantity trickles down the noſtril. If a trocar ſhall be thought neceſſary to the perforation of the Os Unguis, the inſtrument ſhould not be too much curved; which precaution will be neceſſary for the certain and direct conveyance of its point to the Os Unguis. If the trocar be made very curved, the point of it will be brought too much forwards and outwards, inclining to the naſal proceſs of the ſuperior maxillary bone, which, from its thickneſs and ſtrength, will not admit of being broken through without very great force: this muſt always be avoided. Theſe hints will, I am convinced, be found uſeful to thoſe who are not perfectly ſkilled in the ſituation and texture of thoſe parts, and who have not been much accuſtomed to this operation.

N. B. It may be remarked, that, in the treatment of this diſeaſe, I have not recommended preſſure upon the integuments, and ſubjacent Lacrymal Sac, by means of an inſtrument, in incipient abſceſſes and diſtenſions of theſe parts; nor have I ſpoken of the application of ſuch an inſtrument as neceſſary after the operation. I have ſeldom, if ever, found ſuch an application of ſervice. On the contrary, I have often obſerved, that a ſteel inſtrument, however cautiouſly applied, ſits uneaſy on the tender parts, and increaſes the inconvenience ariſing from the malady, by producing pain and uneaſineſs. In my opinion, the beſt preſſure, that can be made in an incipient abſceſs of the lacrymal ſac, is, by one of the fingers occaſionally uſed to preſs on the inferior part of the tumor, when the Sac is loaded and diſtended; which preſſure muſt occaſionally be repeated with caution; ſo that the whole, or the major part, of the accumulated contents of the Sac may be diſcharged through the Puncta Lacrymalia without giving pain. By this ſimple treatment, joined with purgative medicines, and a moderately cooling and aſtringent eye-water, the diſeaſe is prevented from increaſing; and a perfect cure may poſſibly be effected: at leaſt, the neceſſity of ſubmitting to a painful operation will, for a length of time, if not wholly, be prevented. I have ſpoken of the uſe of alteratives after this, and ſome other ſurgical operations; to which let me add, that a judicious treatment of the like kind, before we perform any operation of conſequence, is often adviſeable in bad habits of body. In this, as well as in many other ſurgical diſeaſes requiring operation, opiates occaſionally adminiſtered, evacuations by bleeding, gentle purges, or glyſters, and antiphlogiſtic medicines, joined with a proper regimen in diet, I conſider as neceſſary points to be attended to by the ſurgeon, for the eaſe and ſafety of his patients. Theſe methods ought to be continued till the inquietude, ſpaſms, pain, and ſymptomatic fever, ariſing from the ſeverity of this or any other operation, are removed. In many inſtances, it will be found neceſſary to have recourſe to alteratives, ſometimes of the mercurial kind, ſometimes of the antimonial kind, given alone, or joined with ſuch medicines as are termed antiſeptics; as the Cortex Peruvianus in ſubſtance, or made into decoctions, or infuſions with common water, or ſimple lime-water; the Aqua Calcis magis compoſita, the Aqua Calcis minus compoſita, of the London Diſpenſatory; or decoctions of equal parts of Saſſafras and Sarſaparilla.

Such remedies as theſe, I know, will often be found of great benefit to the patients, and will enable the ſurgeon to effect a cure, which he would otherwiſe, in many caſes, find himſelf unable to accompliſh.

CARUNCULA LACRYMALIS.

This ſmall eminence is improperly ſo named; as it is of a glandular, and not of a fleſhy ſubſtance. It is ſituated in the inner angle of the eye: it ſecretes an oily fluid, as the ciliary glands do, and for the ſame purpoſes: it ſerves likewiſe to direct the tears, in conjunction with the Valvulæ Semilunares, through the Puncta Lacrymalia of the eyelids. It is ſubject to diſeaſes in common with the Glandulæ Sebaceæ of the eye-lids.

VALVULA SEMILUNARIS.

This is a ſmall ſemilunar membrane, continued from the Tunica Conjunctiva. It is ſituated near the Caruncula Lacrymalis, with its concave edge looking towards the pupil of the eye, and its convex edge towards the noſe: it mutually aſſiſts, and is aſſiſted by, the Caruncle, in directing the tears to the Puncta Lachrymalia.

GLANDULA LACRYMALIS.

This gland is of a conſiderable ſize, and of the conglomerate kind. It is placed above the globe of the eye, within the bony orbit, in a cavity of the Os Frontis, and near to the external angle of the orbit. Its uſe is, to ſecrete the tears from the blood; and, when the tears are ſecreted, they are conveyed from this gland by means of their reſpective ducts, which paſs nearly parallel to each other, under and through the expanded Tunica Conjunctiva, to diſcharge their contents upon the ſurface of the eye. By this thin, watry fluid, when aſſiſted by the oily ſecretion of the Ciliary glands and Lacrymal Caruncle, the ſurface of the eye is kept clean, ſmooth, tranſparent, and glazed, for the purpoſes of diſtinct viſion.

This gland, in common with other glandular parts, is ſometimes the ſeat of diſeaſes which require the aid of ſurgery and phyſic; but I know of no diſeaſe that is peculiar to it.

I have a few times ſeen the Lacrymal gland ſo much enlarged, and altered from its natural texture, as at length to evade every kind of aid, but that of extirpation; which, on account of its ſize, its hardneſs, and ſituation, has been accompanied with ſo great a degree of pain, deformity, and impediment to the ſight, as to oblige the poor diſtreſſed Patient to ſue for relief from ſurgical operation; which deſire, under ſome circumſtances, ought reaſonably to be complied with, as I have ſucceſsfully experienced. This ſpecies of ſwelling differs eſſentially from that kind of encyſted tumor which is of the meliceris, or rather of the ganglion kind, taking its riſe amongſt the fatty and membranous parts ſurrounding the bottom of the eye, in the bony ſocket about the optic nerve, which, by its increaſe, ſometimes gradually puſhes the whole globe of the eye outwards and forwards, and occaſions blindneſs. It is a melancholy thing to be reflected upon, that the extirpation of the eye itſelf muſt be ſubmitted to, when this caſe occurs; and, in the former inſtance, though the eye itſelf does not neceſſarily become the ſubject of the operation of extirpation, yet the whole gland being removed gives very ſmall hopes or probability of reſtoring the eye to ſight, eſpecially if the diſeaſe has been ſo long neglected, as to cauſe blindneſs, from the compreſſion which the optic nerve and internal parts of the eye have for a long time ſuſtained.——See my Caſes in Surgery, p. 98. 3d edit.

OF THE MUSCLES OF THE EYE.

THE muſcles of the globe of the eye are ſix in number, which are thus named: 1. Muſculus Superior, ſive Attollens; 2. Inferior, ſive Deprimens; 3. Exterior, ſive Abducens; 4. Interior, ſive Adducens; 5. Obliquus Superior, ſive Trochlearis; 6. Obliquus Inferior, ſive Obliquus Minor. Theſe muſcles take their names from their ſituations and uſes. They are, together with the optic nerve, ſurrounded by a conſiderable quantity of fat, which makes an eaſy bed for them, and for the whole globe of the eye; and by this means greatly aſſiſts the muſcles of the eye, and the eye itſelf, in the variety of motions of which they are capable. All theſe muſcles take their riſe from the fund of the orbit, except the Obliquus Inferior; which laſt muſcle ariſes near the edge of the orbit, on its inferior part. They are ſeverally inſerted, by their reſpective tendons, into the Tunica Sclerotica, but in very different parts of it. The Attollens and Abductor muſcles ariſe from or near to the Foramen Lacerum, at the fund of the orbit, and are inſerted into the Sclerotica by thin and expanded tendons. The Deprimens, Adducens, and Obliquus Inferior muſcles ariſe from the edge of the Foramen Opticum of the Orbit, and are likewiſe inſerted into the Sclerotic Coat: the two former of theſe three muſcles have their tendons expanded as the Attollens and Abductor have. The tendinous expanſions of the Adducens, Abducens, Attollens, and Deprimens muſcles, by being inſerted pretty nearly oppoſite to each other on the anterior part of the Sclerotica, near the Cornea, conſtitute the Tunica Albuginea of the eye. When theſe muſcles contract jointly, they draw the globe of the eye towards the fund of the orbit, and act as antagoniſts to the two oblique muſcles of the eye which ſerve to puſh the globe forwards and outwards. By theſe different actions of the different muſcles, it appears to me, that the ſhape of the globe of the eye is rendered more or leſs depreſſed, or more or leſs prominent, to enable us to ſee with accuracy at different diſtances.

OPTIC NERVES.

The Optic Nerves ariſe ſeparately from thoſe eminences of the Cerebrum, known to Anatomiſts by the term, Thalami Nervorum Opticorum.

Theſe nerves, as they paſs over the Sella Sphenoidalis, near the baſis of the ſcull, approach each other, and become united: they afterwards are ſeparated, and proceed in diſtinct trunks to the Foramen Opticum of each Sphenoidal bone. Through theſe Foramina the optic nerves paſs to the funds of the globes of both eyes, and perforate the Sclerotica and Choroides, in an oblique direction, inclining towards the noſe; where each nerve becomes finely expanded, and forms the Tunica Retina, after having paſſed through the Sclerotica and Choroides. Theſe nerves, when totally deprived of ſenſibility, are accompanied with dilated pupils; an unaltered ſtate of the tranſparent humors of the eye; and, in almoſt all inſtances, with an incapacity of action in the muſcular fibres of the Iris; for which reaſon, the two natural motions of a contraction and dilatation of the Pupils are loſt. This diſeaſe, from the tranſparency of the ſeveral humors, and their membranes or coats, is termed Gutta Serena. The Gutta Serena admits of no operation on the eye itſelf. But, when the caſe is recent and partial, evacuations of blood from the temporal arteries, by leeches or the launcet; from one of the external jugular veins; or from a vein of the arm, joined with briſk purgatives, are adviſeable. Bliſters on the head are likewiſe to be recommended; or an iſſue made by cauſtic on the coronal ſuture, where it joins with the ſagittal; provided bliſters do not ſucceed to our wiſhes. It may be remembered, that a ſtrong decoction in water, of equal parts of Peruvian bark and Valerian root in powder, joined with volatile ſalts, adminiſtered in pretty large doſes at proper intervals of time, is ſometimes practiſed with conſiderable benefit to the patient. The Oleum Animale and Muſk are ſtill more powerful medicines of the nervous tribe; both which, on ſome occaſions, are known to do ſignal ſervice in enervated, and even in paralytic habits of body. Sometimes cold bathing is of great ſervice in this diſorder.

N. B. In treating of this ſubject, I have mentioned, in common with other Obſervers, that the Gutta Serena is attended with dilated pupils; which, in general, is moſt certainly the caſe; but it really is not always ſo: I have ſeen a few inſtances of this diſeaſe, where the pupils were greatly contracted, though not ſo much ſo as to prevent my ſeeing diſtinctly through them. In the inſtance

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of a young gentleman, whom I ſeveral times viſited on a ſimilar occaſion, his defect of ſight was accompanied by a palſy of the lower limbs; in his eyes the pupils were contracted to at leaſt half their natural ſize; the fibres of the Iris had no viſible motion; the humours of the eyes preſerved their natural tranſparency; his ſight was not totally loſt, but it was become ſo much impaired, as to be of little or no uſe to him; and it ſeemed to be affected in a degree pretty nearly equal to that of his legs and thighs. I will further add, that, though dilated pupils be almoſt always a ſymptom of the Gutta Serena, yet every dilated pupil is not a certain ſign of this diſeaſe: experience and obſervation confirm this. Scrophulous ſubjects often have very dilated pupils, attended with little or no defect of ſight; but in them the pupils preſerve their motion; the loſs of which motion is a more certain ſign of a Gutta Serena than a dilatation of the pupils. Theſe obſervations, however ſpeculative they appear, may nevertheleſs probably lead us to ſome uſeful hints in the treatment of our Patients of the ſcrophulous tribe, as they indicate ſome degree of relaxation in their conſtitutions.

The pupils of children are nearly, if not quite, as large as the pupils of adults. I muſt further obſerve, that the ſymptoms, attendant upon an incipient Gutta Serena, and an incipient Cataract, are often ſo nearly alike, as to require every degree of information in this part of anatomy, which we can obtain from obſervation and practice, to entitle us to judge of the caſe with preciſion; but, when theſe diſeaſes are confirmed, or even far advanced, the difference between them is more eaſily aſcertained.

The Gutta Serena and Cataract ſometimes attack the eye, or eyes, at one and the ſame time, though ſeldom; and they keep pace with each other, till both diſeaſes are confirmed. Sometimes the Gutta Serena ſucceeds the Cataract; which unlucky circumſtance is known, in ſome inſtances, to happen after the operation of couching, or extracting the opake cryſtalline humor. This event unavoidably fruſtrates the reaſonable expectation of ſucceſs from the operation, though it ſhould have been performed with the greateſt propriety and dexterity. Sometimes the operation is ſucceeded by a conſiderable degree of inflammation and pain; whilſt, at other times, the Patient happily eſcapes with very little of either.

As I have remarked, that the ſymptoms of an incipient Gutta Serena and Cataract are ſometimes a good deal alike, it would reaſonably be expected, that I ſhould explain in what reſpects they are ſo.

A preceding head-ach, ſituated near the forehead; a dimneſs of ſight, as if gauze was placed before the eyes; the ideas of moths flying before the eyes; are circumſtances and ſymptoms that attend both theſe diſorders in their riſe and progreſs: but, when the Cataract is ſo far advanced as to render the Cryſtalline Lens incapable of converging the rays of light, we may, by looking narrowly in ſome ſubjects, diſcover a ſmall ſpot in the centre of the Lens, by means of a convex glaſs, if not with the naked eye; and we may, in ſome inſtances, ſtill further diſcover opake radii extending from the centre of the Cryſtalline towards its circumference, the interſpaces of which, at the ſame time, remain tranſparent; whilſt in others we may be able, and more commonly too, to diſcover an uniform cloudineſs in the Aranea of the Cryſtalline humour. I once had a Patient, in whoſe eyes the Cataracts advanced ſo ſlowly, as to be full ſeven years before they were confirmed. In the courſe of my attendance upon this gentleman,

man, he ſeveral times informed me, that, when he looked at a ſingle candle, it appeared multiplied, and repreſented a dozen, or more, placed round a circle; which circumſtance probably aroſe from theſe radii being pretty nearly at equal diſtances from each other; whilſt the different diviſions of the Cryſtalline humours preſerved their original tranſparency, and by theſe means were capable of forming many diſtinct foci upon different parts of the Retina. This gentleman's eyes were operated upon when they became uſeleſs; and the Cataracts were happily extracted. The operation reſtored him to a comfortable and uſeful degree of ſight, when aſſiſted by convex glaſſes. His ſight continued for about two years; at the end of that time a Gutta Serena gradually came on, which rendered him irrecoverably blind.

OF THE EXTERNAL COATS OF THE EYE.

THE parts which are immediately concerned in the formation of the eye, are its tunics or coats, its humors, its nerves, and its veſſels of different kinds. The tunics or coats of the eye, from their different ſituations, may with propriety, be diſtinguiſhed into the external coats of the eye, and the internal coats of the eye; by this means, we may more readily form a juſt idea of the compoſition of this wonderfully conſtructed organ, than we probably ſhould otherwiſe be capable of doing, were they not ſeparately treated of.

The external coats of the eye are four; to wit, Tunica Conjunctiva; Tunica Albuginea; Tunica Sclerotica; and Tunica Cornea. The Tunica Conjunctiva, and the Tunica Albuginea, are by ſome anatomiſts termed partial coats. The Tunica Conjunctiva inveſts a part only of the globe of the eye; but to the internal ſurface of the eye-lids it gives a compleat covering; this coat likewiſe covers the Cornea on its external, or convex ſurface.

The Tunica Albuginea is placed immediately under the Tunica Conjunctiva, and is formed by the expanded tendons of the four ſtraight muſcles of the globe of the eye; this coat likewiſe inveſts only a part of the globe, from which circumſtance the Albuginea and Conjunctiva are called partial coats.

The Tunica Conjunctiva is replete with veſſels of the lymphatic kind, which veſſels, in a natural or ſound ſtate, contain a colourleſs fluid; but in a ſtate of inflammation, they are more or leſs filled and diſtended with red blood; which diſtention produces pain; and from the rigidneſs they acquire in this ſtate, when the eye-lids are put into motion, they give the patient the idea of having ſand or grit in his eyes. A fever often accompanies this complaint, attended with a præternatural diſcharge of tears, and an incapacity of looking at the light. When the inflammation is removed, the eyes reſume their natural complexion, and the ſtrength of ſight gradually returns. The Tunica Conjunctiva joins the eye to the eye-lids, and is reflected upon their internal ſurfaces, after having inveſted the globe of the eye on its anterior part.

The inflammation of the Tunica Conjunctiva, which often is of a ſevere and obſtinate kind, ought to be removed as ſoon as poſſible by blood being taken in proper quantities from the temple or temples, by leeches; or the lancet, or by drawing blood from one of the external jugular veins; or from the arm or foot, and occaſionally repeating it. Cupping on the head, neck, or betwixt the ſhoulders, is adviſeable, when the patient will not ſubmit to evacuations of this kind, by bleeding with the lancet or leeches, as we ſometimes find to be the caſe. A loſs of blood by cupping may probably be thought the moſt adviſeable method, in ſome inſtances of this kind, on account of the languidneſs of the Patient; but at the ſame time it may not be amiſs to recollect, that, after bleeding at the arm, the pulſe is often found to riſe, and the oppreſſed ſpirits of the patient to revive, rather than ſink, from this evacuation.

The loſs of blood, when aſſiſted by mercurials given in proper doſes alone, or mixed with ſmall quantities of opium, to prevent their ſitting uneaſy on the ſtomach and inteſtines, and to prevent their paſſing too ſuddenly off by ſtool or vomiting, will, with the farther aſſiſtance of cooling purges adminiſtered at proper intervals, be found of the utmoſt conſequence. The quantity of mercury, and the ſtrength of the purges, ſhould be proportional to the ſtrength and age of the patient, which may be repeated every ſecond or third night, and on the ſucceeding mornings, as we ſee neceſſary.—On the intermediate days, antiphlogiſtic medicines ſhould be preſcribed, together with a ſtrict regimen in diet; and opiates ſhould be occaſionally given; obſerving to adhere ſtrictly to methods of this, or a ſimilar kind, till there is a remiſſion of pain, fever, and reſtleſſneſs; then, and generally not before, the Cortex Peruvianus, in infuſion, decoction, or ſubſtance, mixed with ſomething opening, if neceſſary, ſhould be given more or leſs frequently, dependent upon ſymptoms and appearances; and ſhould be continued for a longer or ſhorter ſpace of time, as may be judged adviſeable. During the inflamed ſtate of the eyes, the Patient ſhould be kept in the dark, and nothing painful or ſtimulating ſhould be applied to them; on the contrary, fomentations of the ſofteſt kind, ſuch as have already been recommended, ſhould be uſed two or three times a day, or oftener, if neceſſary. Soft cooling ointments, and emollient relaxing cataplaſms, will, under many circumſtances, be adviſeable applications to the part; but the eye-lids ought not to be bandaged down for a longer time than may be found neceſſary for keeping on the local applications, as a confinement of the parts neceſſarily prevents a freedom of circulation in the minute veſſels of the eye and its coverings, as well as prevents the tears and ciliary ſecretions from being properly diſcharged.

At the inſtant the inflammation diſappears, and ſometimes ſooner, I recommend lotions that are cooling and moderately aſtringent, ſuch as are compoſed of a ſolution of Saccharum Saturni; or of the Pulvis è ceruſſâ comp. to be uſed two or three times a day, and continued till the eyes reſume their natural ſtrength and colour.—Aſtringent ointment may ſometimes be adviſeable, to rub upon the internal ſurface of the edges of the eye-lids; but they are not often neceſſary, and particularly ſo, as eye-waters may be compoſed in ſuch a manner, as fully to anſwer the purpoſe of ointments, without incurring their inconveniencies.

Children, ſoon after birth, are ſometimes obſerved to be very ſeverely afflicted with general inflammations of the globe of the eye, which extend themſelves to the internal ſurfaces of both eye-lids, producing an external tumor and elevation of the parts: theſe diſorders are accompanied by very copious diſcharges of matter, attended with ſo great a degree of relaxation and thickneſs of the conjunctive

junctive coat, as prevents the ſurface of the Cornea from being inſpected: I have often been conſulted in caſes of this kind, when, upon my attempting to lift up the upper eyelid, or depreſs the lower, the parts became inverted, and diſcovered to me, that the linings of the eye-lids were greatly inflamed: they appeared too conſiderably wrinkled and thickened, reſembling an inverted Inteſtinum Rectum; a great quantity of Pus iſſued from between theſe parts and the globe of the eye itſelf, ſo as moſt effectually to prevent my ſeeing the ſurface of the Cornea. This diſeaſe appears very alarming, and requires immediate aſſiſtance; which, if timely adminiſtered, has been generally ſucceſsful; but when the diſeaſe is neglected, total blindneſs has ſometimes enſued. The methods I have taken for removing this diſorder, are theſe: the eyes are thoroughly waſhed and cleanſed ſeveral times a day, by means of a ſyringe and ſome warm diluting liquor, ſuch as common water warmed, equal parts of warm water and cow's milk, or warm barley-water. Afterwards I apply cooling ointments upon the eye-lids, or emollient cataplaſms, which ſhould be continued till the turgidneſs of the parts is removed: at the ſame time I direct purges of rhubarb alone, or rhubarb with magneſia, to be adminiſtered, and repeated every ſecond or third day, till the diſeaſe gives way. Sometimes I have found it neceſſary to apply leeches to the temples of the infant, and a bliſter moderately irritating to the nape of the neck, or betwixt the ſhoulders, which bliſter has been kept open for a week or ten days, or longer, as I have ſeen neceſſary. After the turgidneſs of the eye-lids ſubſides, and the inflammation of the Tunica Conjunctiva diſappears, (though the diſcharge has in ſome inſtances ſtill continued to flow in conſiderable quantities) I have given with ſucceſs a light decoction of the bark, four or five times a day; now, and not properly before, lotions of the cooling and aſtringent kind may be applied with ſafety to the eyes, and repeated three or four times a day, or oftener, obſerving not to bind the eye-lids down; but on the contrary, to permit them to have as free motion as they are inclined to take: the eyes muſt be kept from the day-light, fire-light, and candle-light, till they are capable of being freely opened. I am apprized, from the particular conſtruction of the eyes of infants, that they are not ſo quick of ſight, as when they grow older; and therefore probably may not be ſo ſoon affected by the light at that early time of life, as they afterwards are, when the Cornea changes its form to a greater degree of convexity, by an increaſed quantity of the aqueous humor being depoſited in the chambers of the eye.

If the inflammation of the eyes be at any time of life joined with a venereal, ſcophulous, or ſcorbutic habit of body, (which experience ſhews us is often the caſe) we muſt not flatter ourſelves with the expectation of totally removing the diſorder, and preventing its return, by the ſimple methods already recommended; but we muſt have recourſe to ſuch remedies as have been mentioned on the ſubject of the diſeaſed Ciliary glands, &c. to which paſſage I refer the reader for my opinion.

Experience ſhews us, that an inflammation of the eye, from its ſeverity, its long duration, and its frequent returns, is often ſucceeded by a thickneſs and opacity of the Cornea; which, if ſlight, and there be no future returns of inflammation on the eye, ſometimes gradually diſappears without any phyſical regimen: ſometimes it gives way to the repeated applications of equal parts of glaſs and white ſugar-candy, reduced to very fine powder by levigation:

tion: ſometimes it is curable by manual operation. But when the diſeaſe is ſo general as to affect the whole depth, or thickneſs of the Cornea, neither of theſe methods ought to be put in practice; nor indeed ſhould they be thought of, if the Cornea be diſeaſed at ſuch a diſtance from its center as to occaſion no impediment of ſight.—I have once or twice been prevailed upon to endeavour at a removal of ſuch an obſtacle by manual operation, contrary to my advice and opinion; which endeavours have proved as unſucceſsful as I expected them them to do. In a few inſtances, where the diſeaſe has been ſuperficial, and that part of the conjuctive coat which is expanded upon the Cornea has been elevated and thickened by an extravaſated opaque fluid depoſited underneath it, I have reſtored my patients to ſight by a removal of the obſtacle with a fine ſharp inſtrument.—If the Cornea ſhould be ſo much affected, as to project conſiderably forwards; and by the ſize and ſhape of the projection, pain and deformity are the conſequences, accompanied by an inability of ſhutting the eyelids; it will then be adviſeable to remove a large circular piece of the Cornea, or the whole of it, that the vitiated humours of the eye may be diſcharged; by which means the diſagreeable and painful ſymptoms diſappear; and ſufficient ſpace is left for the application of an artificial eye to the ſocket, if ſuch a ſubſtitute be approved of.—Before I finiſh my remarks on this ſubject, perhaps it may not be improper to obſerve, that in ſome inſtances the whole eye, from an original defect of the veſſels, coats, and humours of the internal parts of the globe, becomes ſo greatly enlarged, as to puſh out conſiderably from the bony orbit, producing great deformity and acute pain, extending to the membranes of the brains, and the brain itſelf; which admits of little or no remiſſion from pain, but what is procured by opiates, and gentle evacuations. Within theſe three years I have had two Patients under my care, with this ſpecies of diſeaſe; the one was a young lad of about fifteen or ſixteen years old, in other reſpects healthy; the other was a young lady, about thirty years of age, with a very unhealthy aſpect, and infirm ſtate of body. The young man's eye was become rather more than twice its natural ſize; the humours in the eye preſerved their tranſparency, ſo that I had an opportunity of eaſily diſcovering, that the pupil of the eye was greatly enlarged, and that there was no motion left in its muſcular fibres; the external coats of the eye were put much on the ſtretch, and ſome of the lymphatic arteries of the Tunica Conjunctiva were replete with blood: his pain was great, and almoſt continual; and it had long been ſo ſevere, as to compel him to ſubmit patiently to any expedient that might be thought adviſeable for his relief; and particularly ſo, as every method that had hitherto been tried, had proved ineffectual. I propoſed the extirpation of the eye, as the only chance, I thought, could be offered—He readily embraced the propoſal, and I performed the operation with a ſharp round-edged knife, of a ſmall ſize, with a ſtrait blade, a common diſſecting hook, and a knife with a convex blade, made in a ſingular manner, well adapted to this and ſometimes other purpoſes; a drawing of this inſtrument I have given in the third edition of my Caſes in Surgery. There was no hæmorrhage in conſequence of the operation, but ſuch as was eaſily ſuppreſſed by ſoft dry lint. The whole globe of the eye, together with the optic nerve, even with the Foramen of the Os Sphenoides, through which this nerve paſſes from the brain, was removed. Soon after the operation, the poor lad was a good deal convulſed; and for the ſpace of twenty-four hours, frequent retchings to vomit, joined with conſiderable pain in the head, enſued; but by abſtinence, bleeding at the arm, giving him opiates, and febrifuge medicines of the ſaline kind, at proper intervals, his ſymptoms gradually abated; and he continued to go happily on, till his cure was compleated, which happened in about five weeks, without any further inconvenience.—The young lady's caſe, I have juſt now mentioned, was in all reſpects infinitely worſe than that of the young man. Her diſeaſe was of much longer continuance. The globe of the eye projected ſo much from its orbit, as to put on a terrible aſpect; the tumor was much larger than a hen's egg, but of a different ſhape: the external coats of the eye were much thickened, and nearly reſembled raw muſcular fleſh, in their colour and texture. The internal coats and humors of the eye had totally loſt their form and tranſparency; they aſſumed the appearance of ragged, ſoft ſubſtances; and were mixed with dark-coloured, thick fluid. The greateſt part of the fluid eſcaped, as ſoon as an opening was made into the cavity; the inciſion was directed from above downwards, ſo as nearly to deſcribe a ſemicircle, which gave me an opportunity of extending my inciſion round the whole diſeaſed parts externally, ſo as to deſcribe a complete circle. This being effected, I directed my knife to the bottom, and lateral parts of the bony ſocket; and removed the four ſtrait muſcles from their origin, as well as the whole of the Tunica Sclerotica, together with that part of the optic nerve which paſſes through the Foramen Opticum of the Sphenoidal bone. A fluctuation in the tumor was ſlightly diſcoverable before the operation, which I thought a favourable circumſtance; but till the operation was put in practice, I was at a loſs about the true nature of the contents of the ſwelling. This young lady had, for more than ſeven years, endured ſo great a degree of pain, as to deprive her of her natural reſt and appetite: when ſhe put herſelf under my care, ſhe appeared emaciated, infirm, ſallow, and dejected; latterly ſhe had been attacked with fainting and convulſive fits, of which ſhe had frequent returns. Various methods had been tried for her relief, previous to her coming to London; and amongſt the reſt ſome painful topical applications had been uſed. Theſe proved not only ineffectual, but added to her diſtreſſes. I adviſed the extirpation of the whole diſeaſed part, as the only chance that

BOSTON MEDICAL
AUG 13 1927

could reaſonably be propoſed for her recovery. She ſubmitted to it with reluctance and great apprehenſions: however, I performed the operation in the manner I have already deſcribed. There was nothing found neceſſary for reſtraining the hæmorrhage, but dry lint mixed with wheat-flower; with which the whole cavity of the orbit was lightly filled up: upon the lint was placed a pledgit of fine tow, ſpread with Ceratum Album: and over the dreſſings a ſoft linen roller was applied, with a moderate degree of tightneſs.—For ſome days after the operation, ſhe had ſevere pains in the head, and a conſiderable degree of fever, attended with frequent retchings to vomit, and inquietude.—Opiates, clyſters, and medicines of the diaphoretic kind, were occaſionally preſcribed, and ſubmitted to; which methods, joined with the loſs of eight or ten ounces of blood from the arm, produced their deſired effect.—The third day after the operation, freſh dreſſings of the ſofteſt kind, preceded by emollient fomentations, were carefully and tenderly applied to the part; obſerving, at the ſame time, not to remove any of the original applications, either at this or any other time, but ſuch as were looſened, and detached from the reſt.—In conſequence of theſe neceſſary precautions, the patient at no time of dreſſing endured much pain.

The orbit of the eye, in about ten days after the operation, began to produce granulations of a favourable kind; and ſo it continued doing, till the greateſt part of the cavity was nearly filled up by a firm and ſolid ſubſtance. The wound, in about ſix weeks, was ſmoothly healed, without its being ever neceſſary to have recourſe to painful applications.—During the laſt two or three weeks, the Cortex Peruvianus, ſometimes in decoction, ſometimes in ſubſtance, was given, with a view of ſtrengthening the habit of body, and promoting the healing of the wound; both which deſigns were viſibly promoted by this medicine.

N. B. When the diſeaſe of the eye is of a cancerous nature, the tumor ſometimes takes its riſe from the brain; and is accompanied with an adheſion of the globe itſelf, and its neighbouring parts, to the bony orbit; which is often found to be carious; under ſuch circumſtances, no ſevere operation in ſurgery ought to be performed, with a view of curing, or even relieving the Patient.—Such an attempt muſt neceſſarily be productive of great miſchief, by aggravating and increaſing the ſeverity of the diſorder; which, in its worſt ſtate, may be in ſome degree relieved, by local applications of the moſt emollient kind, aſſiſted by gentle evacuations, a ſoft, nouriſhing diet, and the Extractum Cicutæ given internally in proper quantities, and at proper intervals; joined, if neceſſary, with a fomentation and cataplaſm of the ſame herb, applied two or three times a day to the diſeaſed part; obſerving, at the ſame time, to keep the body from coſtiveneſs; and to join opiates with the Cicuta, if that medicine alone ſhould not be found equal to the deſign of giving eaſe, and promoting reſt.

The propriety of treating this ſpecies of diſeaſe with the utmoſt gentleneſs, may very reaſonably be produced as an exception to the following phyſical maxim, "That a doubtful remedy is better than none;" and more eſpecially, as we may aſſure ourſelves, from the reſult of experience in this, and ſome other melancholy caſes, that ſevere remedies have frequently worſe conſequences than the diſeaſes themſelves.

Before I finiſh my remarks on this ſubject, it may be proper to obſerve, that although the Cicuta ſeems rather to loſe than gain credit in this kingdom; I am nevertheleſs convinced, from the reſult of my own experience, that it is a medicine which oftentimes proves ſignally ſerviceable; ſince to this herb many of my Patients in the hoſpital, as well as thoſe who are in a much higher rank of life, are much indebted, for the preſervation of ſome of thoſe parts, amongſt many others of leſs note, which nature has formed and deſigned, as the utmoſt conſequence to manhood; which parts were condemned by ſome of the experienced in ſurgery to extirpation, as being thought incapable of relief by gentler methods. My own experience and obſervations have induced me to think favourably of the Cicuta in many caſes, though by no means in all. When I have uſed the Cicuta, or its extract, in ulcerated cancers, as an internal medicine, as well as an external one; I mean as a fotus and cataplaſm; I have very often found it to be of little or no ſervice to my Patients. But where there is an indurated tumor or tumors of the glandular parts, having the general ſymptoms and appearances of a ſchirrus; ſuch as a ſtony hardneſs, an enlargement, an inequality of ſurface, and diſtended blood-veſſels, joined with obtuſe pain in the part deeply ſituated; in ſuch inſtances, I ſay, I have ſeveral times ſucceeded to the utmoſt of my expectations, and the wiſhes of the diſtreſſed, by giving the Extractum Cicutæ internally; uſing it at the ſame time as a fotus and cataplaſm, applied twice a day to the part affected. In ſome inſtances the remedy has been found effectual in two or three months, or a ſhorter time; whilſt, in others, I have known it require a perſeverance for ſix, ſeven, or eight months. The manner in which I have given the Cicuta, is in general with a decoction of the Peruvian Bark, occaſionally mixed with a ſmall quantity of rhubarb, to prevent coſtiveneſs.—The quantity of the Cicuta adminiſtered, muſt be proportional to the age and ſtrength of the Patient, and it muſt be gradually increaſed; obſerving firſt to begin with moderate doſes of it. Before it be adminiſtered, it will be adviſeable to empty the bowels properly, by giving two or three purges: and if the Patient, at any time during the courſe of the Cicuta, complains of ſickneſs at the ſtomach, dimneſs of ſight, or giddineſs; which ſymptoms are now and then known to occur; theſe attacks will ſoon be removed, by leſſening the quantity of the medicine, or by totally omitting it for a few days; remembering, at the ſame time, to give one or two purges, or an emetic, if this happens. When theſe ſymptoms diſappear, the Cicuta ſhould be repeated and continued as long as may be thought proper. In adults I generally begin with twelve, fifteen, or twenty grains of Extractum Cicutæ, more or leſs, agreeably to the ſtrength of the Patient. The Cicuta muſt be made into pills, and divided into equal proportions; ſo that one third may be given three times a day, at proper intervals of time: each doſe of the pills muſt be waſhed down with two ounces, or more, of the Decoctum Corticis: in ſome inſtances I have gradually increaſed this medicine to the quantity of ʒjſs a day, and upwards.

In ulcerated cancers, making great deſtruction of the integuments, muſcles, and glandular parts, upon the thorax and other parts of the body, I have experienced great advantages from the uſe of the Peruvian Bark, and powder of Serpentary, given in conſiderable doſes, and repeated at proper intervals, without the Cicuta.—The powder of Cortex alone, made into draughts with the tincture of roſes, has proved very efficacious, in cancerous ulcerations, accompanied with profuſe hæmorrhages; obſerving, at the ſame time, to refrain from improper diet of all kinds, and to acidulate the Patient's liquors with the Spiritus Vitrioli Tenuis; unleſs theſe acids prove hurtful to the ſtomach and inteſtines: which they are known ſometimes to do. Opiates, of the cordial kind, muſt be occaſionally adminiſtered, to give eaſe, and procure reſt under painful circumſtances; and the body muſt at all times be kept moderately open.—Every local application to the wound, when in a tender ſtate, without hæmorrhage, muſt be of the ſofteſt kind; but when hæmorrhage demands it, ſuch applications as are known to be moſt effectual for theſe purpoſes, muſt be had recourſe to: ſuch, for inſtance, as the agaric of oak, prepared ſpunge, puff-ball, or lint dipped in ſpirit of turpentine made hot: theſe applications muſt be kept on the part by preſſure, with bandage, or by the hand of an aſſiſtant; after having firſt applied a pledgit of lint, or tow, or both, on the part, ſpread with a ſoft cooling ointment, ſuch as Ceratum Album, or Linimentum Album.

N. B. If it be urged as an argument, in oppoſition to the uſe of the Cicuta, that a confirmed Schirrus, or in other words a cartilaginous-like texture of a gland, whoſe center, upon enquiry, after extirpation, appears to form a cavity, that contains an extravaſated fluid, reſembling thick coffee, cannot be made to ſubmit to any other treament than manual operation, I readily agree to this opinion; but, before the diſeaſe arrives at this ſtate, which, indeed, conſtitutes the true characteriſtic of a Schirrus, the Cicuta may very probably do what afterwards it is found incapable of; and ſometimes the habit of body will be much mended by this medicine joined with the Cortex. Of the following maxim we may reſt perfectly aſſured, that a Schirrus and Induration are diſtinct diſeaſes; and that, although every Schirrus is an Induration, yet every Induration is not a Schirrus: the want of a proper diſtinction of which fact, I am inclined to think, has miſled ſome ingenious men, who are deſervedly eſteemed eminent in their profeſſions.

OF THE TUNICA SCLEROTICA, AND TUNICA CORNEA.

THE SCLEROTICA, ſive CORNEA OPACA, and the CORNEA LUCIDA, are, in fact, one and the ſame coat; though very differently circumſtanced as to ſize, ſituation, texture, and uſe. The Sclerotica is a large, firm, thick, hard, opaque membrane, compoſed of ſeveral ſtrata cloſely united. It is extended from the external circumference of the Cornea to the Optic Nerve; and forms by much the greater part of the globe of the eye externally. The Sclerotica and the Cornea together compoſe the caſe, in which all the internal coats of the eye, and its humours, are contained. The Cornea, when compared with the Sclerotica, is but moderate in ſize, forming only a ſmall ſegment of a circle. The Sclerotica, on its poſterior part, is perforated obliquely in five or ſix different places by thoſe branches of the internal carotid artery, that are beſtowed upon the internal coats of the eye, and its humors; which veſſels by Nuck are called Aquæducts. From this anatomiſt they are termed Aquæductus Nuckii, ſive Ductus Oculorum Aquoſi; upon the ſuppoſition, that they conveyed lymph into the eyes from a neighbouring ſource. By Hovius they are called Neuro-Lymphatica Vaſa Adducentia.

The Cornea Lucida is compoſed of ſeveral Laminæ, and is the anterior portion of the Sclerotica. This coat, from its tranſparency and ſituation, admits of the Tunica Iris; the Pupil of the eye; and the Cryſtalline Lens, with its inveſting Membrana Aranea, being eaſily ſeen and examined into; provided the Aqueous Humor and the Pupil be in their natural ſtate: but, when the Cornea becomes thickened, or the Aqueous Humor becomes turbid, or the Pupil becomes totally contracted; from one, or either, or from all theſe cauſes, no judgment can be formed of the ſtate of the eye beyond the Iris.

The Cornea is prominent, or externally convex; but it is more or leſs ſo in different ſubjects. This convexity, together with the natural convexity of the Cryſtalline Lens, ſerves to refract and converge the rays of light in a greater or ſmaller degree, in proportion to their roundneſs, or convexity; and to bring the ſeveral rays of light together, more or leſs, immediately to form a diſtinct picture behind the Cryſtalline Lens; which point of junction, or contact, is called the Focus of the eye. Thoſe eyes which are very convex render the ſubjects near-ſighted, and incapable of diſtinguiſhing objects with preciſion and accuracy, when held at a diſtance; which puts them under the neceſſity of holding the objects very near their eyes, to enable them to read, write, work, or to diſtinguiſh the different features of the different faces of their friends and acquaintance. To remedy this inconvenience, ſuch people are neceſſarily obliged to make uſe of a glaſs, or ſpectacles, of a concave form; which degree of concavity muſt be proportioned to the greater or leſs degree of convexity of the eyes, to enable them to ſee with ſatisfaction and pleaſure at the ſame diſtances that a well-formed eye is capable of doing. On the contrary, when the Cornea and the Cryſtalline Lens are of a more than uſually flat conſtruction; under ſuch circumſtances, the objects muſt be placed at a conſiderable diſtance, to enable them to ſee with accuracy and diſtinctneſs. To remedy this defect and inconvenience, a glaſs or glaſſes, of a due degree of convexity or roundneſs, muſt be ſubſtituted for this purpoſe; for as, in a more than uſually round or convex eye, the rays of light approach each other, and are brought to a point before they reach the bottom of the eye, where the Retina is ſituated; and by this means render viſion confuſed and imperfect: ſo, in a depreſſed or flatly-formed eye, the different rays of light will not meet ſoon enough behind the Cryſtalline Lens to form the Focus upon the Retina, but behind it; and this will always happen, unleſs a convex glaſs, or glaſſes, be uſed for the purpoſes of refracting and converging the rays of light in a greater degree than the flatly-formed eye can do of itſelf. When the rays are much converged, the perſon, whoſe eyes want the aid and aſſiſtance of a concave glaſs, or glaſſes, is termed Myops, or ſhort-ſighted, or pur-blind; the perſon, whoſe eyes ſtand in need of a convex glaſs, or glaſſes, is called Preſbus, or long-ſighted, or old-ſighted: the latter is a defect of ſight, to which old people are more ſubjected than young. However, it ſhould be remembered, and probably it may be remembered too with ſome ſatisfaction, by thoſe who in youth are of the near-ſighted tribe, that, as they advance in years, their ſight will improve, by the eyes becoming more depreſſed or flattened than they were in youth, from a natural tendency in theſe parts to become ſo; and by theſe means the eyes will then be able to ſee thoſe objects with accuracy at ſuch diſtances as, till now, they had no power of doing.

As it is very difficult, nay, hardly poſſible, for the ſurgeon to determine from his experience, of what degree of convexity, or concavity, the glaſs, or glaſſes, ſhould be conſtructed, to aſſiſt properly the imperfection of many people's eyes, that are too round, or too flat, in their make; I have often found it expedient to refer them to the ſhop of an optical inſtrument-maker, to chooſe for themſelves; which they can better do, than can be done for them. Perhaps, it may not be improper to remark in this place, that, in thoſe eyes in which the Cornea Lucida is moſt prominent and convex, the Tunica Iris will be found at a greater diſtance from the Cornea, than in thoſe eyes that are of a different ſhape; and that the inſtrument will be leſs likely to wound or injure the Iris in an eye that is formed with a convex or prominent Cornea, than in an eye that is formed with a flat or depreſſed Cornea, when the operation of inciſing the Cornea, and extracting the Cryſtalline Lens, is attempted by the operator, to reſtore thoſe eyes to ſight which are afflicted with the diſeaſe called Cataract: in the former inſtance, the anterior chamber of the eye is larger than in the latter; and therefore more or leſs ſpace is left for the introduction of the inſtrument into the anterior chamber of the eye, proportional to its ſize. Since, then, ſo convex a body, as the Cryſtalline Lens appears to be, is quite diſcharged from the eye by the operation of opening the Cornea, and extracting the Cataract, or is removed from its bed, by depreſſing it below the Pupil in the operation of Couching; it muſt neceſſarily happen to thoſe eyes which have been thus operated upon with ſucceſs, that they muſt be aſſiſted with convex glaſſes, as ſubſtitutes for the loſs of the cryſtalline humors.

OF THE INTERNAL COATS OF THE EYE.

THE internal tunics, or coats, of the eye are known by the following names. 1. Tunica Choroïdes; 2. Tunica Iris; and, 3. Tunica Retina. The Tunica Choroïdes and Tunica Iris are, in fact, one and the ſame membrane. The internal ſurface of the Choroïdes, called the Ruyſchian coat, from Profeſſor Ruyſch, or the Vaſcular coat, from its texture, immediately inveſts the external or poſterior ſurface of the expanded, ſoft, and medullary ſubſtance of the optic nerve called Retina; and the external ſurface of this membrane inveſts the Sclerotica on its internal part, to which it is firmly attached by numerous veſſels. The Tunica Iris, or anterior portion of the Choroïdes, is, by almoſt all Anatomiſts, treated of as a diſtinct coat of the eye. This coat is of different complexions in the eyes of different people; and ſometimes too it is obſerved to be of different ſhades, or colours, in one and the ſame eye; from whence its name is derived. A little way behind the Iris are placed the Proceſſus Ciliares. The Tunica Choroïdes, Tunica Iris, and Proceſſus Ciliares, appear from injections to be almoſt wholly vaſcular. Very near, but not quite in the middle or centre of the Iris, is a circular hole, commonly called the Sight of the eye; but, by Surgeons and Anatomiſts, this hole is termed the Pupil of the eye. The poſterior ſurface of the Iris, the Proceſſus Ciliares, and a part of the Tunica Choroïdes, are covered with a black Mucus, for the purpoſes of accurate and diſtinct viſion: the removal of this black ſlime from the Choroïdes, the Iris, and the Proceſſus Ciliares, gives us an opportunity of diſcovering the natural complexion of theſe parts, as well as the manner in which they are conſtructed. The Iris is compoſed of two orders of fibres, which are diſpoſed in different directions: theſe fibres, from their courſe, are known by the following appellations; the Longitudinal fibres of the Iris, and the Circular fibres of the Iris. The Longitudinal fibres of the Iris are thoſe which tend in radii, or parallel lines, from the external or larger circumference of this membrane to the internal or ſmaller circumference of it. Where the Circular fibres of the Iris commence, and ſurround the Pupil, they appear ſomewhat prominent behind the border of the Pupil. The Longitudinal fibres of the Iris, and Circular fibres of the Iris, act as antagoniſts to each other. When the Longitudinal fibres of the Iris contract, the Pupil becomes more than uſually dilated, by their drawing the Iris equally on every ſide towards its origin, or adheſion to the Ligamentum Ciliare. The Ligamentum Ciliare is a circular line, ſomewhat elevated, and placed betwixt the termination of the Sclerotica on its anterior part, and near to that part where the Cornea commences; to the Ligamentum Ciliare the edge, or border, of the Choroïdes is firmly attached. The Circular fibres of the Iris, when they act forcibly, contract the Pupil of the eye, by overcoming the force or power of the Longitudinal fibres of the Iris. The Muſcular fibres of the Iris, and the Proceſſus Ciliares, are of a whitiſh, or light-brown colour. When the black pigment is removed, the Proceſſus Ciliares then appear to be at ſome diſtance from each other, whoſe interſpaces are filled up with the black mucus already deſcribed. Theſe fibres are continuations of the poſterior Lamina of the Iris, or rather of the anterior Lamina of the Choroïdes. The ſpace between the interior and concave ſuface of the Cornea, and the anterior ſurface of the Iris, is termed Camera Anterior, or the fore-chamber of the eye. The ſpace betwixt the poſterior ſurface of the Iris, and anterior ſurface of the Cryſtalline humor, with its inveſting membrane, is termed Camera Poſterior, or the back-chamber of the eye. The Camera Anterior, or fore-chamber of the eye, is much larger than the Camera Poſterior, or back-chamber of the eye. Both theſe ſpaces are completely filled with the aqueous humor.

The third internal coat of the eye is the Tunica Retina. In colour it is ſomewhat white; in texture it is thin; in conſiſtence it is ſoft and tender. This membrane is extended from the contracted extremity of the Optic Nerve, as ſoon as it has paſſed through the Sclerotica and Choroïdes, quite to the extremities of the Proceſſus Ciliares. The Retina is uniformly expanded upon, and attached to, the internal ſurface of the Choroïdes. Amongſt Anatomiſts, this membrane is now, I believe, univerſally ſuppoſed to be the immediate ſeat of ſenſation and ſight.

By the antients, the Cryſtalline Lens was ſurmiſed to be the immediate organ of viſion. By Mariotte, the mathematician, and his contemporaries, the Choroïdes was ſuppoſed to be ſo.

In the cavity of the globe of the eye, or rather in its two cavities, into which we find the globe of the eye is divided by the Tunica Iris, though unequally, we readily diſcover three colourleſs humors of very different compoſitions; which, in their natural and ſound ſtate, are equally tranſparent. From their different reſemblances, they are called the Aqueous Humor, the Cryſtalline Humor, and the Vitreous Humor. Theſe Humors, together with the Cornea, ſerve the three following notable purpoſes, eſſential to ſight. They refract the rays of light; they converge the rays of light; and they bring the rays of light together on the bottom of the eye, ſo as to form a diſtinct image of the object we look at; which place of contact is termed, by Opticians, the Focus.

The Focus of the eye, then, is the point where the rays meet, and croſs the axis after refraction by a glaſs, or, in other words, the part where the rays converge, and form upon the Retina an exact reſemblance of the thing we look at, in ſize, ſhape, and colour, though in an inverted poſition.

This will be almoſt always the caſe; unleſs the anterior membrane of the eye, termed Tunica Conjunctiva, be changed from its natural colour, by means of the contents of the lymphatic veſſels of this coat being tinged with yellow by the reflux of the Bile into the maſs of blood; which we know is a common circumſtance with thoſe who are, to a great degree, afflicted with the Yellow Jaundice: for, as the Conjunctive Coat is expanded forwards, ſo as to cover the whole external and convex ſurface of the Cornea; all the rays of light, which are tranſmitted through the Cornea, the Aqueous, the Cryſtalline, and Vitreous humors, to the bottom of the eye, to conſtitute the Focus, muſt of neceſſity paſs firſt through the expanſion of the Conjunctive Coat; and by theſe means a ſimilar effect will be produced from this cauſe, and for the ſame obvious reaſons too, as is brought about by looking through a yellow pair of ſpectacles. From this ſimple experiment it will appear, that the objects which we look at will appear yellow; if the ſpectacles be made of green glaſs, the idea impreſſed upon the mind will be that of green; if the ſpectacles be made of blue glaſs, our ideas of the colour of objects will then be changed to blue; and ſo on.

The humors of the eyes, from theſe ſimple experiments, cannot poſſibly receive any change in their colour: nor does it ſeem at all neceſſary they ſhould do ſo, to produce ſuch effects; ſince the colour of the object we view depends upon the firſt medium through which the rays of light paſs, and not through the ſecond, third, or fourth medium.

I have, at different times, had opportunities of converſing with Patients afflicted with the Yellow Jaundice to a great degree; the conjunctive coats of whoſe eyes were deeply tinged by the diſeaſe: from time to time curioſity has induced me to queſtion them on this matter. They all informed me, who were in this ſituation, that to them objects appeared yellow; and ſo they continued to do till the diſeaſe was in part removed; when objects appeared yellowiſh. At length, when the diſeaſe was ſo much better, that the eyes had reſumed their natural complexion, they diſtinguiſhed colours as they had been uſed to do before they were ill. The Aqueous Humor lies looſely in the cavity of the eye, and fills up the whole of the anterior and poſterior chambers of that organ. In the Aqueous Humor the Iris is ſuſpended: this coat is in part ſupported, and preſerved in an expanded ſtate, by the uniform preſſure that is made upon its ſurfaces by the Aqueous Humor. The Aqueous Humor is the thinneſt, or rareſt, Humor of the three that are contained within the coats of the eye; for which reaſon, the rays of light, in their paſſage to the Retina and Fund of the eye, are leſs refracted and converged than they are by the Cryſtalline or Vitreous Humor; which two Humors are more denſe and ſolid than the Aqueous Humor, though equally tranſparent.

All the rays of light that are refracted by the Cornea, thoſe only excepted which are tranſmitted through the Pupil, are in part reflected, and in part buried, or abſorbed, by the Iris, on account of the opacity of its poſterior ſurface. The latter effect (ſuffocation of the rays of light) is more fully produced by the black pigment of the Proceſſus Ciliares, and Choroïdes, than can be done by the external ſurface, or Lamina, of the Iris: and this muſt be in a degree proportional to the different degrees of opacity in their colours; ſince, from the reſult of ſome ingenious experiments relative to this matter, it appears, that all light colours are diſpoſed to reflect the rays of the ſun more powerfully, than dark colours can do; conſequently, dark colours will attract moſt of thoſe luminous rays which light colours repel. By this wiſe contrivance in the compoſition of the eye,

diſtinct

diſtinct viſion is produced; which otherwiſe would be confuſed and indiſtinct.

The Aqueous Humor is plentifully ſecreted by the extremities of the moſt minute Lymphatic arteries of the Iris, called by ſome Ductus Aquoſi. Through the mouths, or orifices, of theſe veſſels, this thin watry fluid is diſcharged, and depoſited in the two chambers of the eye. Correſponding with theſe veſſels are proportional numbers of minute Lymphatic or Abſorbent veins, which receive and occaſionally return a proper quantity of this thin fluid into the larger veins; and ſo on into the courſe of the general circulation. By a ſimilar conſtruction of parts, the Cryſtalline and Vitreous Humors are ſecreted, provided, and returned; and their purity and tranſparency are thus equally preſerved. The Cryſtalline Humor, or Lens, is ſituated immediately behind the Aqueous Humor at the termination of the poſterior chamber of the eye: this is by much the moſt firm, ſolid, and compact body of the three. The Cryſtalline is compoſed of Laminæ like an onion; though by no means are they ſo diſtinct: it is naturally colourleſs.

From the niceſt enquiries, it appears, that, at the ages of twenty-two years, and fifty years, in different ſubjects, the Aqueous and Cryſtalline Humors were nearly, if not quite, equal in weight. In the younger ſubject, the weight of each of theſe Humors, as well as in the older, amounted to four grains. In the younger ſubject, the weight of the Vitreous Humor was equal to ninety-five grains; in the older ſubject, the weight of this Humor amounted to one hundred and four grains. So that, at the age of twenty-two years, the weight of theſe Humors was nearly in proportion as twenty-four to one; and, in the latter, as twenty-ſix to one. The weight, therefore, of theſe Humors in the human eye, at a medium, may be eſtimated as twenty-five to one.

As we advance in age, the ſolidity and firmneſs of the Cryſtalline Humor increaſe. In advanced age, the Cryſtalline frequently changes its complexion to an amber colour, without loſing its tranſparency: this Humor however gradually loſes its convexity. Theſe facts are very neceſſary to be remembered by thoſe, whoſe profeſſions lead them to practiſe this branch of ſurgery. The Cryſtalline Humor is lodged and confined in a cavity on the anterior ſurface of the Vitreous Humor; which cavity is inveſted by a very fine membrane, called Tunica Vitrea.

The Tunica Vitrea, at the edge or circumference of the Cryſtalline Lens, is divided into two Laminæ. The anterior Lamina is extended forwards; covers the Cryſtalline Lens, and makes a bag for its reception. The membrane of the Cryſtalline Humor is termed Aranea, or Arachnoïdes, from the delicacy of its texture: this coat is generally known amongſt ſurgeons by the more eaſy and familiar term Capſula of the Cryſtalline Humor; which name is derived from its office.

The Cryſtalline Humor, in ſhape, is ſomewhat convex: in tranſparency, it reſembles cryſtal: from its form it is termed a Lens. This body is obſerved to be more prominent, round, or pointed, on its poſterior, than on its anterior ſurface.

It derives its ſmall veſſels from the Proceſſus Ciliares, which are branches of that vaſcular circle, placed behind the Iris, termed Circulus Arterioſus.—The Circulus Arterioſus is formed by ramifications, proceeding from the internal carotid artery.

Theſe minute veſſels enter into the body of the Cryſtalline and Vitreous Humors, through the Capſulæ, in the ſhape of very fine Lymphatics.

The Vitreous Humor is ſituated behind the Cryſtalline Humor, and is much greater in quantity than the other two Humors, when conſidered together; as already has been obſerved; and conſequently occupies by much the greateſt part of the cavity of the Globe of the Eye.—The Vitreous Humor is a fluid of a gelatinous kind: it is contained in a very fine membrane, or coat, termed from its ſituation, Tunica Vitrea; from the delicacy of its texture it is termed Arachnoïdes.—The Vitreous Humor reſembles the white of a raw new-laid egg, or fuſed glaſs.—The internal Lamina of the Vitrea, not only inveſts the ſurface of the Vitreous Humor, as its external Lamina does the Cryſtalline; but it dips down, inſinuates itſelf into the ſubſtance of the Vitreous Humor, and is ſeparated into a variety of diſtinct cells or bags; in which bags are depoſited different portions of this Humor. The Tunica Vitrea is rendered viſible, by putting the whole of this Humor into a glaſs of clear water; but its diſtinct cells cannot be made viſible without the aſſiſtance of an acid liquor to coagulate it withal.—The Vitreous Humor conſiſts principally of a Congeries of Lymphatic veſſels; which are derived from the numerous veſſels of the internal Lamina of the Choroïdes.

The Tunica Vitrea is grooved on its ſurface, in a variety of places, for the reception of the Proceſſus Ciliares. Theſe Sulci are black as the interſpaces of the Proceſſus Ciliares are; from their uſe they are termed Sulci Ciliares.

The Cryſtalline and Vitreous Humors, from the circumſtance of their being encyſted, admit of being eaſily taken out of the eye, in a recent ſubject; and when the Cornea and Iris are wholly removed, theſe Humors will bear an inverſion of the parts, from the natural ſtrength of the Aranea, without ſubjecting the Lens to eſcape immediately from the bed of the Vitreous Humor; and the Lens will preſerve its conjunction with the Vitreous Humors, till the Capſula of the Lens is broken, torn, or divided; but ſo ſoon as this happens, the Lens immediately eſcapes from the Vitreous bed, and falls out.

This circumſtance is neceſſary to be attended to by the operator who undertakes to aſſiſt his Patient's ſight, by endeavouring at a depreſſion or extraction of the Cataract; for, till the Capſula be opened, the diſeaſed Cryſtalline Humor can neither be removed below the Pupil of the Eye, by the couching needle; nor can it be ſafely extracted through a wound made by inciſing the Cornea, without running too great a riſque of breaking the cells of the Tunica Vitrea, and diſcharging a conſiderable portion of their contents: the conſequence of which will probably be, a depreſſed globe, attended with irrecoverable blindneſs, as I have ſometimes ſeen.—The Aqueous Humor, by lying looſely in the anterior and poſterior chambers of the eye, as well as by reaſon of its fluidity, will immediately be evacuated, when the Cornea is inciſed: in conſequence of which evacuation, the Cornea and Iris loſe that ſupport, and reſiſtance, which they before received from the Aqueous Humors: from this moment the Cornea becomes flaccid, rumpled, and uneven on its ſurface; and depreſſed to ſo great a degree, as to ſink down upon the anterior ſurface of the Iris. Again, the Iris ſubſides, and comes in contact with the Cryſtalline Lens: the two chambers of the eye are now no more; and at the ſame time the pupil becomes unuſually dilated.—The two laſt circumſtances of the Tunica Iris, lying upon the anterior ſurface of the Cryſtalline Lens, and the enlargement of the pupil of the eye, are, I think, worthy of obſervation, by the operator who attempts the extraction of the Cataract: for when the Iris ſinks down, and lies upon the Lens, it will be juſt the ſame thing in effect, as though the Lens was advanced forwards; and it will enable the Surgeon to divide the anterior portion of the Capſula of the Cryſtalline Lens with much more eaſe and ſafety, than he could poſſibly do, were this Humor at as remote a diſtance from the Iris: as it is known by the ſkilful in anatomy to be, when the poſterior chamber is replete with the Aqueous Humor.—Again, the Pupil being enlarged, and the Iris rendered flaccid, the Cataract will be made more eaſily and readily to eſcape through the Pupil into the anterior chamber of the eye; and from thence through the opening made into the Cornea, than it could poſſibly be made to do, were the Pupil contracted and the Iris extended.—In ſhort, in the one inſtance there will be a large hole for the diſeaſed Lens to paſs through, accompanied by a flaccid membrane, capable of making but little reſiſtance to the Cataract: in the other inſtance, there would be a reſiſtance to the Cataract from the Iris; were that membrane not flaccid; and from the pupil too; were that ſmall and contracted.—The internal coats of the eyes are ſubjected to inflammation and obſtructions, as the external coats are; though perhaps not ſo frequently: when they are attacked with diſeaſes of this kind, aſſiſtance cannot be too immediately given, by ſuch methods as are adviſed on the head of Inflammations of the Conjunctive Coat, and Ciliary Glands; and if the diſeaſe does not ſpeedily give way, the conſequence is generally bad, ariſing from the turbidneſs of the Humors, and an opacity of the Aranea and Tunica Vitrea, as well as a thickneſs of the Iris, together with an adheſion of this membrane to the Cryſtalline, and a contraction of the Pupil. The inflammation ſometimes terminates in an abſceſs. The pain ariſing from an internal inflammation of the eye, is generally more acute, and more dangerous, than from an external inflammation, and conſequently more diſtreſſing to the afflicted Patient.

OF THE CATARACT.

THAT diſeaſe of the globe of the eye, which is diſtinguiſhed from other diſeaſes of this part by the term Cataract, is ſufficiently known to the experienced in ſurgery to be an affection of the Cryſtalline Humor of the eye.

When the Cataract is confirmed, there is ſuch an opacity of the Cryſtalline Humor as totally obſtructs the rays of light in their paſſage, and conſequently prevents them from producing ſuch effects upon the bottom of the eye, as are brought about in a tranſparent or undiſeaſed ſtate of it; provided the Retina and Vitreous Humor be perfect, and the Cataract is not complicated with any other affection of the eye. But, though the Cataract be impervious to by much the major part of the rays of light; it muſt be remembered, that ſome of theſe rays paſs obliquely betwixt the Iris and Cataract; and the eye diſtinguiſhes light and glaring colours. To have a competent knowledge of this diſeaſe, and to be enabled to diſtinguiſh it from any other defect of the eye, it is previouſly neceſſary to be thoroughly acquainted with the ſituation of the Cryſtalline Humor;

Humor, with the changes of colour this Humor naturally undergoes in ſome ſubjects at different times of life; and likewiſe to know, that, when the Cataract is complicated with any of the following circumſtances, to wit, a conſiderable change of the ſhape of the globe of the eye, a thickneſs and clowdineſs of the Cornea, an inſenſibility of the Retina, it is abſolutely wrong to attempt the operation of couching. It is likewiſe neceſſary to be aſſured, that the ſucceſs of this operation, which at beſt is precarious, is much more ſo when there is an adheſion of any part of the diſeaſed Cryſtalline to the Tunica Iris. In this diſorder, it is not only proper to be acquainted with the manner of performing the operation, but to diſtinguiſh whether the caſe be not attended with ſuch circumſtances as may render the ſucceſs of it more than uſually uncertain, if not abſolutely improper. To diſcriminate whether the globe of the eye be, or be not changed from its natural ſize and ſhape, is not at all difficult, by comparing it with a ſound eye, or by merely reflecting upon its natural form. If the Conjunctiva or Cornea be thickened, that circumſtance may be readily known, by remembering that theſe are the anterior coats of the eye, and therefore cannot well be miſtaken for the Cataract, which is an opacity of the internal part of the globe, whoſe ſituation is oppoſite to, and a little way beyond, the Pupil, by looking through which, the diſeaſe will diſcover itſelf by the Cryſtalline being changed into a cream colour, a pearl colour, or a darkiſh grey, &c.

If there be ſuch a defect in the expanſion of the Optic Nerve as renders it inſenſible, and this be the only diſeaſe, the Patient's eye will not be affected by the ſtrongeſt light; the eye will be perfectly tranſparent, the Pupil will be generally dilated, and there will, in moſt inſtances, be no motion at all of the fibres of the Iris; at leaſt, the motion of the Pupil will be ſo ſmall, as to be diſtinguiſhed with difficulty.

From theſe ſeveral circumſtances being compared with thoſe relating to the Cataract, it will be eaſy to underſtand the difference betwixt the few diſeaſes of the eye I have here taken notice of. However, I am convinced, the beſt method that can be taken to inform thoſe, who have but a ſuperficial idea of the ſtructure and diſeaſes of the eye, is to exhibit three eyes; the firſt with a thickneſs and opacity of the Cornea; the ſecond, with a Gutta Serena; the third, with a Cataract; which I have often done, for the information of ſuch whoſe educations have not entitled them to acquire a ſufficient knowledge of theſe diſeaſes; by which means they have received more immediate and permanent inſtructions than they could otherwiſe have acquired.

To explain what is meant by an adheſion of the Cataract to the Iris, and to convey ſuch an idea of this circumſtance to thoſe who have not acquired a previous knowledge of the parts, I am apprized, is a taſk that is attended with ſome difficulty; becauſe it is firſt of all neceſſary to know, that the Cryſtalline Lens is at a ſmall diſtance from the Iris in its natural ſtate, and by this means forms the poſterior chamber of the eye. However, I may venture to pronounce, that, under theſe circumſtances of the diſeaſe, the Cryſtalline Lens is either moved forwards, or the Iris is moved backwards, to produce this effect; and that, if there be a complete adheſion of theſe two parts, the original ſpace betwixt the anterior part of the Cryſtalline Humor, and poſterior part of the Iris, becomes loſt, the action of the Pupil ceaſes, and the rays of light are incapable of being tranſmitted beyond the Iris and Cataract; on which account, there is no degree of ſight in that eye; ſo that the ſtate of the Retina and Vitreous Humor, conſequently, cannot be judged of; which are ſufficient reaſons for forbidding the operation of couching.

If it be urged, that, under ſuch circumſtances, it may be adviſeable to perform the operation of dividing the Iris above or below the Cataract; I anſwer, that the ſame objections are to be made to this attempt. In ſhort, to ſpeak plainly and fairly, however ingenious that operation of dividing the Iris may be thought (in caſe of an abſolute contraction of the Pupil, or of a perfect adheſion of the Cataract to the Iris), which was invented and recommended by that great operator Mr. Cheſelden; I muſt confeſs, I never yet ſaw a ſingle inſtance of ſucceſs from it, and therefore cannot recommend it as an adviſeable operation under any circumſtance whatſoever.

If the adheſion of the Cataract to the Iris be in part only, and the Retina be perfect, there will be a ſufficient quantity of the rays of light tranſmitted obliquely, betwixt the Iris and Cataract, to the lateral parts of the Retina, to enable the Patient to diſtinguiſh light, and ſometimes too ſuch bodies as are white or red. Under theſe circumſtances of the diſeaſe, the operation is adviſeable, in expectation of affording that relief to the blind, which they, by any other means, have very little or no chance of attaining to: the probability of which may be learned from the following caſe of W. L. But, before I proceed to relate it, I muſt obſerve, that, if one eye only be affected with a Cataract, and the other be perfectly ſound, or in a conſiderable degree uſeful, the operation ſhould never be undertaken, even ſuppoſing the diſeaſe to be of the moſt favourable kind; for, let the ſucceſs of the operation be ever ſo happy, the eye, from which the Cryſtalline Lens is removed, cannot be reſtored to a degree of perfection at all equal to that of the ſound eye, without the aſſiſtance of a convex glaſs.

A SHORT ACCOUNT OF SOME EXTRAORDINARY FACTS ATTENDING THE OPERATION OF COUCHING.

W. L. aged twenty-ſix, about nine years before he applied to me, was ſuddenly attacked with a dimneſs in his eyes. The diſorder continued for three years in much the ſame ſtate; when it began to increaſe; and continued increaſing till he became incapable of diſtinguiſhing objects. He remained under theſe circumſtances till March, 1748; when he came to London, and put himſelf under my care.

The diſeaſe was a Cataract in each of the Cryſtalline Humors. The Cataract in the right eye appeared to adhere to the inferior part of the Iris, but without any defect or alteration in the ſhape of the Pupil. He was capable of diſtinguiſhing light and colours. In the left eye, the Cryſtalline Humor was adherent to the greateſt part of the Iris. The Pupil of this eye extended beneath the Cataract, and had changed its ſhape from a circle to a perpendicularly oblong form; through the lower part of which, a ſmall ſhare of light was admitted to the bottom of the eye.

From theſe circumſtances, I judged it improper to meddle with the left eye; and, at the ſame time, conſidered the event of the operation as precarious in the right. However, I undertook it upon a probability of ſucceſs, and couched the right eye on the third of April following.

Upon endeavouring to depreſs the Cataract, I perceived it to make a conſiderable reſiſtance to the inſtrument; which was occaſioned by its adheſion to the inferior part of the Iris: ſo that I was obliged to direct my needle underneath the Cataract, and lift it up, before I could diſengage it from the Iris; this I effected with ſome difficulty, and at length depreſſed it.

The Patient ſuffered very little pain from the operation. In ſix days after, I examined the eye; when the Cataract appeared to have reſumed its former ſituation.

On the third of May following, I couched the eye a ſecond time. The Cataract now ſubſided much more eaſily than before. This operation was attended with as little pain as the preceding. Upon examining the eye a week after, I perceived the Cataract to have riſen a ſecond time, but ſo imperfectly, as to cover the lower half of the Pupil only; the upper half of it appeared clear; and he could diſtinguiſh letters through it by the help of a convex glaſs.

I was in hopes, from this appearance, that the Cataract might, in time, have ſubſided (as I have frequently known it do under the like circumſtances). But, on account of the little pain the Patient had ſuffered from theſe operations, he inſiſted upon a third; which I performed upon the twenty-third of the ſame month; when the Cryſtalline was eaſily depreſſed. But ſuch was the diſpoſition of the Cataract, that it roſe up again, though in ſo ſhaking and waſted a condition, as to promiſe a ſpeedy diſappearance. However, the Patient being diſſatisfied, and unwilling to return home upon a bare probability of its waſting away; I was prevailed upon to perform the operation a fourth time.

The Cataract ſubſided upon the ſlighteſt touch of the needle, and did not appear again.

The Patient, in a fortnight after the operation, was capable of reading and writing, with the aſſiſtance of a convex glaſs; and he now ſees well enough to follow his profeſſion of ſurgery and pharmacy. It is remarkable, that there was hardly any inflammation, or pain, in conſequence of either of theſe operations.

When this gentleman firſt began to look at a candle, or any other ſingle object, it appeared to him multiplied; and, when he firſt read, he conceived of letters as remaining imprinted upon the bottom of the eye for ſome hours afterwards; but by a little uſe theſe phænomena were quite removed.

REMARK I.

From this example it appears, how difficult it is effectually to remove the Cataract, when complicated with an adheſion to the Iris: and, again, how warrantable it is to repeat the operation, with a probability of ſucceſs, in ſuch caſes as are attended with the like favourable circumſtances.

If the Cryſtalline had been totally removed by extraction, theſe returns of the diſeaſe could not have happened: but I am inclined to think, that, if this had been attempted, the operation probably would not have terminated ſo happily; ſince the Vitreous Humor muſt, in all likelihood, have been wholly, or in a great part, diſcharged, in endeavouring at a removal of the Cryſtalline; inſtances of which I have known, and attended to, with ſuch circumſtances as to render a ſecond operation impracticable. So that, however ſucceſsful this method of operating may have proved in Cataracts that are free from adheſion; yet I think the operation is not likely to be attended with equal benefit, when they are otherwiſe circumſtanced.

REMARK II.

To this diſeaſe the eyes of people of all ages are liable, even from the birth to the moſt advanced time of life.

It is no unuſual thing for ſurgeons to ſee children who were born with Cataracts: but, at the ſame time, it muſt be acknowledged, that it is more common to us to be adviſed with by Patients in the middle ſtage, or decline of life, whoſe eyes are attacked with this complaint.

Cataracts take their riſe from very different cauſes. Sometimes they are the conſequences of blows, wounds, or punctures; but not often. When they are produced from external cauſes, they are ſpeedily confirmed, and are very ſeldom relievable by manual operation; becauſe, at the time of the accident, ſome other parts of the eye ſuffer ſo much, as to render the diſeaſe truly complicated.

When the Cataract ariſes from an internal cauſe, the diſeaſe is always the conſequence of

Obſtructions in the nutrient and ſecreting veſſels of the Cryſtalline Humor; the moſt evident proofs of which are, the Cataract being the only viſible defect of the eye, and the Patient's often receiving great advantages from an operation.

On children born with Cataracts, the operation is performed with more difficulty in infancy than at a more advanced time of life: becauſe their eyes are almoſt always in motion. For this reaſon, it is adviſeable to defer operating upon them till they are come to ſuch an age as admits of their being properly adviſed on this head. The conſtant rotatory motion of the globes of the eyes is a proof of their diſtinguiſhing light: owing to the luminous rays that paſs betwixt the Iris and Cataract to the lateral parts of the Retinæ: but, as an inſpection of children's eyes may be made without difficulty, the operator will be enabled to determine with equal judgement at this, as at any other time of life.

When ſucceſs attends the operations performed on thoſe who are born with Cataracts, we find they learn to diſtinguiſh, and know perſons and things, by degrees: for, notwithſtanding they have already been taught to know and diſtinguiſh by the touch, they are nevertheleſs incapable of doing ſo with the eyes, till they have been for ſome time accuſtomed to ſee and obſerve.

From the obſervations of many ingenious men, it appears, that the powers of ſeeing and diſtinguiſhing are gradually acquired.

My own experience convinces me of this fact, from the obſervations which I have, at different times, made on Patients who were born blind: to ſome of theſe I have been happy enough to give a comfortable degree of ſight by couching them.

The youngeſt perſon born with Cataracts, I ever couched, was nine years old: the oldeſt perſon, I ever couched under ſimilar circumſtances, was a young woman of almoſt ſixteen years old.

This young woman, by accident, met a Negro-man in the public-ſtreet, ſome few weeks after ſhe had received her ſight, and had learnt to diſtinguiſh faces. She expreſſed great ſurprize at the blackneſs of the Negro's complexion; and was rather frightened at, than pleaſed with, this new object.

OF THE OPERATION OF COUCHING.

THE method which I recommend for performing the operation is this. The Patient being ſeated upon a firm ſeat of a convenient height; immediately behind the Patient is placed an aſſiſtant; who ſupports the head, and inclines it a little forwards, by preſſing gently againſt the back part of the Patient's head, with his breaſt alone, or by the aſſiſtance of a pillow placed betwixt the aſſiſtant's breaſt, and the Patient's head; the aſſiſtant muſt, at the ſame time, carefully lift up the ſuperior eye-lid, and preſerve it in this ſituation, by preſſing it againſt the upper part of the Orbit: at the ſame time, the operator muſt gently depreſs the inferior eye-lid with the fore and middle finger of his left hand; ſuppoſing the operation be performed upon the left eye; with this precaution, that the Globe of the eye be not preſſed upwards, or ſqueezed. Two aſſiſtants, one on each ſide, muſt ſecure the Patient's hands; theſe things being done, the other eye muſt be covered with a ſilk handkerchief, or any thing elſe that is light and pliable; the Patient then is directed to look ſtraight forwards, or with the eye a little inclined towards the noſe; the operator now ſuddenly penetrates the Globe of the eye with the couching needle (which has firſt been made warm by dipping the blade of the inſtrument in hot water) through the Tunica Conjunctiva and Albuginea, at a very ſmall diſtance beyond the circumference of the Tunica Cornea, and as exactly as poſſible in a line with the moſt external part of the circle of the Pupil; the inſtrument muſt now be cautiouſly puſhed forwards, till it appears behind the Pupil, which it will always do when the eye remains tranſparent, and the eye-lids are kept open: the operator now endeavours to preſs the Cataract gently downwards, and a little outwards, with the flat ſurface of the inſtrument, which will ſometimes be immediately and happily effected; but if the Cataract ſhould not readily ſubmit, the needle muſt be carefully moved underneath the Cataract, and gently raiſed up; by which means the Cataract may be ſeparated from the Proceſſus Ciliares and Aranea below, and at the ſame time be diſengaged from the inferior portion of the Tunica Iris (ſuppoſing it to be ſlightly connected with that membrane) which cannot always be foreſeen: after the Cataract is thus lifted up, the poſition of the couching needle muſt be altered, and directed a little above the upper portion of the circle of the Pupil, afterwards inclining the inſtrument downwards, and obliquely outwards; at the ſame time taking great care not to wound the Iris, or the Proceſſus Ciliares: becauſe a wound made into the veſſels of theſe parts of the eye will be followed by a diſcharge of blood, ſufficiently great to render the Aqueous Humor opake, and embarraſs the operator.—By theſe means the Cataract will be ſo effectually diſlodged from the bed of the Vitreous Humor, and its nutrient veſſels be ſo perfectly deſtroyed, as to bring on its gradual decay. In introducing the needle through the coats of the eye; to wit, the Tunica Conjunctiva, Albuginea, Sclerotica, Choroïdes, and Tunica Retina, it will be right to do it with the flat ſurfaces of the inſtrument, looking upwards and downwards; ſince, by this method, leſs violence will be done to the Coats of the Eye, than if the blade of the inſtrument had penetrated the eye in a tranſverſe direction. When the operation is finiſhed, the Patient's eye-lids muſt be immediately ſhut, and covered with a rag, dipped in a ſolution of Saccharum Saturni, or the Pulvis è Ceruſſâ compoſitus in Roſe-water cold, which muſt be very gently bound on with a ſoft linen roller. The Patient muſt be let blood, and kept in a dark place ſo long as the pain and imflammation remain. After the operation, the Patient ought to ſit upright for ſome hours, as this will be the moſt favourable poſture for preventing the riſing of the Cataract. To render the Cataract ſtill the leſs liable to reſume its natural ſituation, as well as to prevent a fever, the Patient muſt live abſtemiouſly for ſome days, and take ſuch food as requires little or no chewing. It now and then happens, that retchings to vomit ſucceed this operation; but this ſymptom ſeldom remains long: when it has proved more than uſually ſtubborn, I have known opiates do great ſervice, when mixed with the ſalt of wormwood draughts. Fomentations of warm milk, applied to the eye-lids twice or thrice a day, and continued for five or ſix minutes or longer each time by the help of a warm Sponge or a bit of fine rag, are neceſſary ſo long as any inflammation, pain, or ſtiffneſs of the eye, remains. If the eye ſhould continue weak, and be attended with a more than common ſecretion of the tears, after the inflammation and pain are removed; I have, in ſuch inſtances, made uſe of cold ſpring-water, or damaſk-roſe-water, mixed with a third, or fourth part of brandy, Hungary-water, or ſimple Lavender-water, to advantage: at other times, I have uſed the Aqua Sapphirina, lowered with common water, or a ſolution of Saccharum Saturni, or the Pulvis è Cеruſſâ compoſitus, in Roſe-water: or a mixture of Hungary-water, and Roſe-water, or common water and French brandy, with which the eyes have been waſhed morning and evening; obſerving at the ſame time, not on a ſudden to expoſe the eyes to the light, but to uſe them gradually to it. The length of time neceſſary for confining the Patient's eyes from the light is quite uncertain; in ſome, there is very little inflammation or pain after the operation; in others, there is a great deal of both, attended ſometimes with ſevere head-aches; when theſe ſymptoms occur, the patient muſt take purges, and if neceſſary, perpetual bliſters ſhould be applied behind the ears, or to the nape of the neck, or betwixt the ſhoulders; which ſhould be kept open as long as may be found neceſſary.

In one inſtance of a boy born with Cataracts, which at two different times I endeavoured to depreſs, I found them ſo uniformly ſoft, that they made no reſiſtance at all to the inſtrument; and admitted of its paſſing through and through them, juſt as it is known to do through the Aqueous Humor of the Eye: the boy received no benefit from the operations. This is not that ſpecies of Cataract diſtinguiſhed by the name of the Bag Cataract, which is of the conſiſtence of cream, is contained looſely in the coat of the Cryſtalline called by Anatomiſts the Aranea; which coat being wounded, evacuates its contents, and diffuſes them in the anterior and poſterior chamber of the eye, mixing with the Aqueous Humor, and rendering the eye turbid; but it is a ſpecies of Cataract *ſui generis*, which is rarely met with; and which, from any peculiar appearance it diſcovers before the operation is performed, I believe cannot be aſcertained. The ſpecies of Cataract I have juſt now deſcribed will probably be more frequently met with in young than old people, as the Cryſtalline Lens, in its natural ſtate, is known to Anatomiſts to be more ſoft in infants than in adults. Since this particular caſe has occurred to me I have couched a young lady of thirteen years of age, who was born with Cataracts; but there was no appearance of this liquid ſtate of the diſeaſe. The operation was performed on both eyes, one of which ſucceeded very well: however, in this caſe, the

Cataracts were more ſoft, and gave leſs reſiſtance to the inſtrument, than could be wiſhed, which ſometimes, indeed, happens at the moſt advanced period of life.

The blade of the couching needle ſhould be at leaſt a third part larger than thoſe generally uſed upon this occaſion, as great advantages, I believe, will be found in the depreſſion of the Cataract, by the increaſed breadth of the blade of that inſtrument.—The handle of the couching needle, if made ſomewhat ſhorter than is uſually done, will enable the operator to act with greater ſteadineſs than he can do with a longer handled inſtrument.

For this hint I acknowledge myſelf under obligations to my worthy friend and acquaintance, Mr. Gooch, of Norfolk; whoſe candor and abilities, in the profeſſion of Surgery, are ſo great, and whoſe general character has long been ſo firmly eſtabliſhed, as to be incapable of receiving any advantages from ſuch encomiums as I am capable of beſtowing.

AN ACCOUNT OF THE METHODS USED FOR THE EXTRACTION OF THE CATARACT.

THE manner in which this operation may be performed, is as follows.—The Patient being ſeated upon a large trunk, or box, the operator places himſelf exactly oppoſite, upon a ſeat of a convenient height; and in a room where the light is moderate, that the Pupil may not be too much contracted.

This being done, an aſſiſtant ſtands behind the Patient, who puts his right hand under the Patient's chin; after having covered the right eye, ſuppoſing it to be the left which is to be operated upon: the aſſiſtant then places the back part of the Patient's head on his breaſt, at the ſame time directing the face upwards, to prevent the ſudden diſcharge of the Vitreous Humor. He afterwards lifts up the ſuperior eye-lid with two or more of his fingers, taking care not to preſs upon the Globe of the Eye above: the operator, at the ſame time, depreſſes the inferior eye-lid, with this precaution, not to preſs upon the inferior part of the Globe of the Eye till the inciſion is made. The Patient muſt look ſtraight forwards, and a little upwards. The operator now fixes his right elbow upon his right knee; after having put his right foot firmly on the Patient's ſeat for this purpoſe. He then ſuddenly and reſolutely introduces the point of his knife through the external part of the Cornea oppoſite to the center of the Pupil, directing it horizontally betwixt the anterior ſurface of the Iris, and the interior ſurface of the Cornea, into the fore chamber of the eye, till it penetrates through the Cornea on its oppoſite ſide; when the inferior part of the Cornea muſt be ſuddenly divided, by directing the blade of the knife downwards, and outwards. The larger and lower the inciſion is made, the better will the operation be likely to ſucceed; and if it happens, that the wound through the Cornea proves too ſmall, it muſt be enlarged by a pair of ſharp ſciſſars, well poliſhed; the blade of which muſt be curved, ſo that they may have a convex and concave ſurface.

The next proceſs of the operation is to wound the Aranea. This ought not to be attempted till a few minutes after the Cornea has been inciſed: as ſoon as the inciſion is made through the Cornea, the eye-lids ſhould be let looſe.

By paying a proper attention to theſe maxims, the whole of the Aqueous Humor will be evacuated; the Iris will become flaccid, and ſubſide upon the Cataract; the Pupil will be dilated, and the inſtrument for cutting through the Capſula, may then readily be directed under the flap of the Cornea to the inferior edge of the Pupil. From theſe precautions the Pupil will eſcape violence: to which it is very liable from the paſſage of the Cataract through it, when contracted and ſmall.— Immediately after the membrane is wounded, the Globe of the eye muſt be preſſed gently upwards, that the Cataract may be ſqueezed through the Pupil and inferior part of the Cornea, where the inciſion has been made.— The Cataract being thus removed, the eye-lids muſt be covered with a ſoft double or triple rag, dipped in a cold ſolution of Saccharum Saturni, or the Pulvis è Ceruſſâ compoſitus, prepared in Damaſk Roſe-water, or ſpring-water; this application muſt be kept on with a ſoft linen roller, and renewed two or three times a day. The Patient muſt be laid on his back upon a bed, or couch; and in this ſituation he muſt keep himſelf for ſome days, that the wound made through the Cornea may heal, and the newly-ſecreted Aqueous Humor may be prevented from eſcaping out of the eye.

I look upon the diviſion of the Capſula of the Cataract to be of great conſequence in this operation; ſince this membrane becomes ſometimes ſo tough and thick, as to make a very conſiderable reſiſtance to the preſſure of the Globe of the eye; in which caſe, a great part of the Vitreous Humor is diſcharged, unleſs the Capſula of the Cataract be wounded.

It ſometimes happens, that the Cataract immediately follows the diviſion of the Cornea, without making any external preſſure upon the Globe, owing probably to the ſudden and involuntary contraction of the muſcles of the Globe, which draw the eye inwards, and forcibly compreſs it on every ſide.

This operation, it muſt be remembered, cannot be properly and ſafely performed but upon ſuch as have the power of keeping their eyes from rolling about; and therefore, I ſay, muſt not be undertaken in thoſe ſubjects who were born with Cataracts, as their eyes are always in motion, unleſs the eyes can be kept fixed and ſteady with the fingers, or with a properly conſtructed inſtrument, ſo contrived as not to preſs rudely on the eye.

The common Speculum Oculi muſt not be made uſe of in this operation, ſince the compreſſion from that inſtrument will be found to

be

be ſo great, as to ſqueeze out a part of the Vitreous Humor, before the operator can make the wound ſufficiently large through the Cornea, for the expulſion of the Cryſtalline Humor.

It very often happens that a ſmall part of the Vitreous Humor is diſcharged in the moſt ſucceſsful operation; but I have ſeldom known it happen otherwiſe in ſuch caſes, than to be ſoon reſtored.

The inflammation ſucceeding this operation is generally conſiderable; but neither that, nor the operation, ſeems to be very painful. It is frequently ſeveral weeks after the operation, before the inflammation of the eye is diſperſed.

During this ſtate, the eye ſhould be treated with emollient fomentations and cooling applications, and the Patient's body muſt be kept open: opiates likewiſe muſt occaſionally be adminiſtered,

If the Cornea of the right eye is to be divided, the operator places himſelf in the ſame ſituation as has been already directed, ſuppoſing he has a power of uſing his left hand to advantage; but if he has not a ſufficient command of his left hand, he muſt ſtand behind the Patient, and, after having lifted up the ſuperior eye-lid, he muſt uſe his right. The aſſiſtant at the ſame time ſtands before the Patient, and holds down the under eye-lid with the precautions already given.

The proper knife to be made uſe of in this caſe is exactly like that which is recommended for the performance of the operation of cutting through the Iris; only that it muſt be about three times as broad, and about twice as thick.

The inſtrument for the purpoſes of dividing the Capſula of the Cataract, is repreſented at Fig. 4, in Plate II. and at Fig. 2. This inſtrument is paſſed under the Cornea to the Cataract, at its inferior part.

REMARK.

IN the two different operations of Couching and of extracting the Cataract, it may be proper to obſerve, that different parts of the globe of the eye ſuffer from the different inſtruments that are uſed upon theſe occaſions.

In the firſt mode of operating, the couching-needle is paſſed through all the coats which are concerned in compoſing the external, as well as the internal parts of the globe of the eye, except the Cornea and the Iris; to wit, the Tunica Conjunctiva, the Tunica Albuginea, the Tunica Sclerotica, the Tunica Choroïdes, and the Tunica Retina.

From wounding the Tunica Retina, it is probable, thoſe temporary retchings to vomit, and ſevere pains in the eye and forehead ariſe; which are ſometimes known to ſucceed this operation.

In the ſecond method of operating (for the extraction of the Cataract) the external parts of the eye that ſuffer are, the Tunica Cornea, together with the thin covering which this coat receives from the expanſion of the Tunica Conjunctiva.

The internal coat that ſuffers in this operation, is the Aranea, or Capſula of the Cryſtalline Humor.

The violence done to the Aranea is common to both modes of operating, and is indiſpenſably neceſſary for the execution of our deſign of depreſſing, or of extracting the Cataract: but, when the border of the Pupil is wounded, by the couching-needle being directed too forwards, or is lacerated, by the Cataract forcing its way ſuddenly through the Pupil; the conſequence proves ſometimes ſo unhappy, as to be incapable of relief.

For, in ſome inſtances, the Pupil becomes totally contracted; and the rays of light are thereby rendered incapable of paſſing to the Tunica Retina, the Optic Nerve, and the Thalami Nervorum Opticorum: whilſt, in other inſtances, the Pupil ſuffers only in its ſize and ſhape; and the rays of light are not at all obſtructed. No other inconvenience happens from the laſt cauſe, but an irregularity in the ſhape of the Pupil, and an inability of its contracting and dilating ſo freely, as where the natural form of the Pupil is preſerved.

Theſe two accidents I have known to happen unavoidably, from the operation of opening the Cornea, and extracting the Cataract; but never, that I remember from Couching: unleſs the Iris has been inadvertently wounded with the needle; which a ſkilful operator may always avoid.

The accidents of the greateſt importance, which ſometimes attend the operation of extracting the Cataract, are, a ſinking down of the globe of the eye, a deformity, and an irrecoverable loſs of ſight; proceeding from too great an evacuation of the Vitreous Humor at the time of operating.

The principal inconvenience of note, attendant upon Couching, is the Cataract's riſing again after it has once been depreſſed; from whence ariſes the neceſſity of repeating the operation, and very often with a probable view of ſucceſs.

The moſt effectual means of preventing the Cataract's reſuming its original ſituation, after it has once been depreſſed, is to deſtroy as effectually as poſſible the Aranea, by moving the blade of the inſtrument in different directions; provided the Cataract has not readily ſubmitted to preſſure: for, by thus perſevering for ſome time, we ſhall often meet with ſucceſs.

Pl.1.

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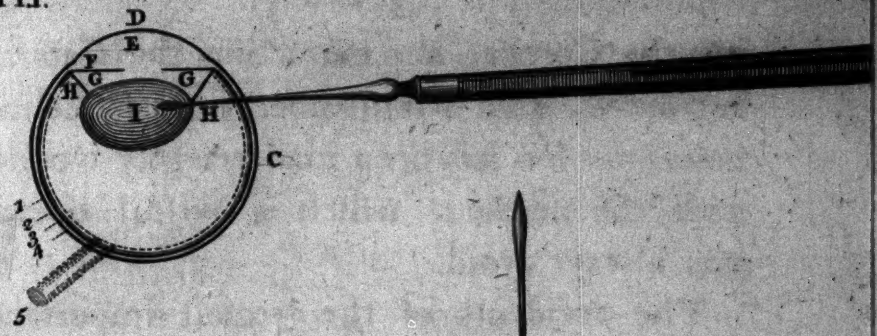

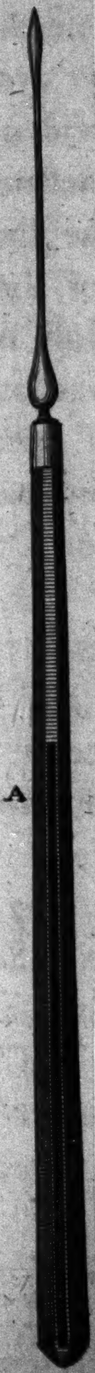

A. *The Couching Needle*

B. *The Couching Needle paſsed into the Eye with its Blade lying upon the Cataract.*

Pl.1.

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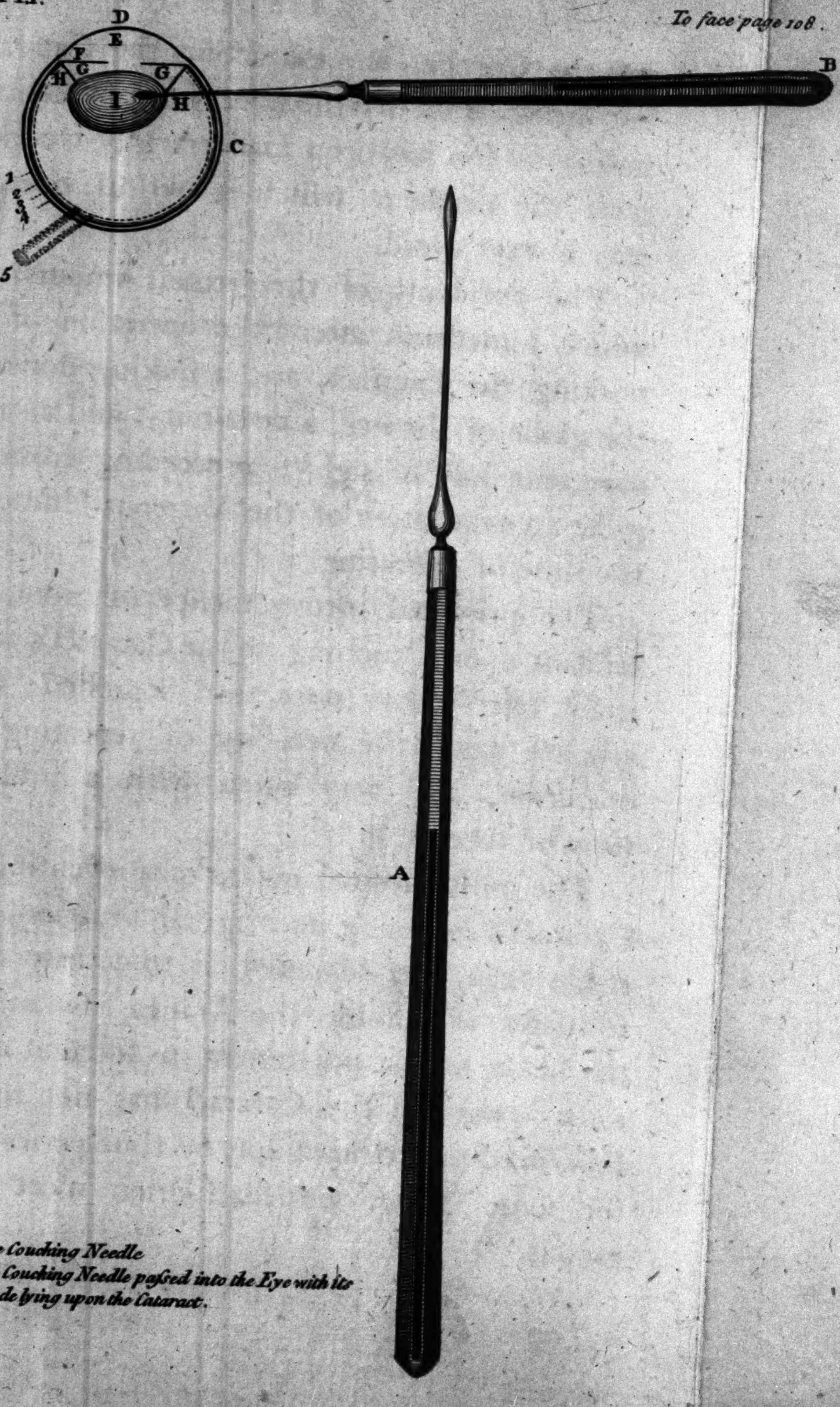

A. The Couching Needle

B. The Couching Needle paſsed into the Eye with its Blade lying upon the Cataract.

To face page 108.

Pl. 2.

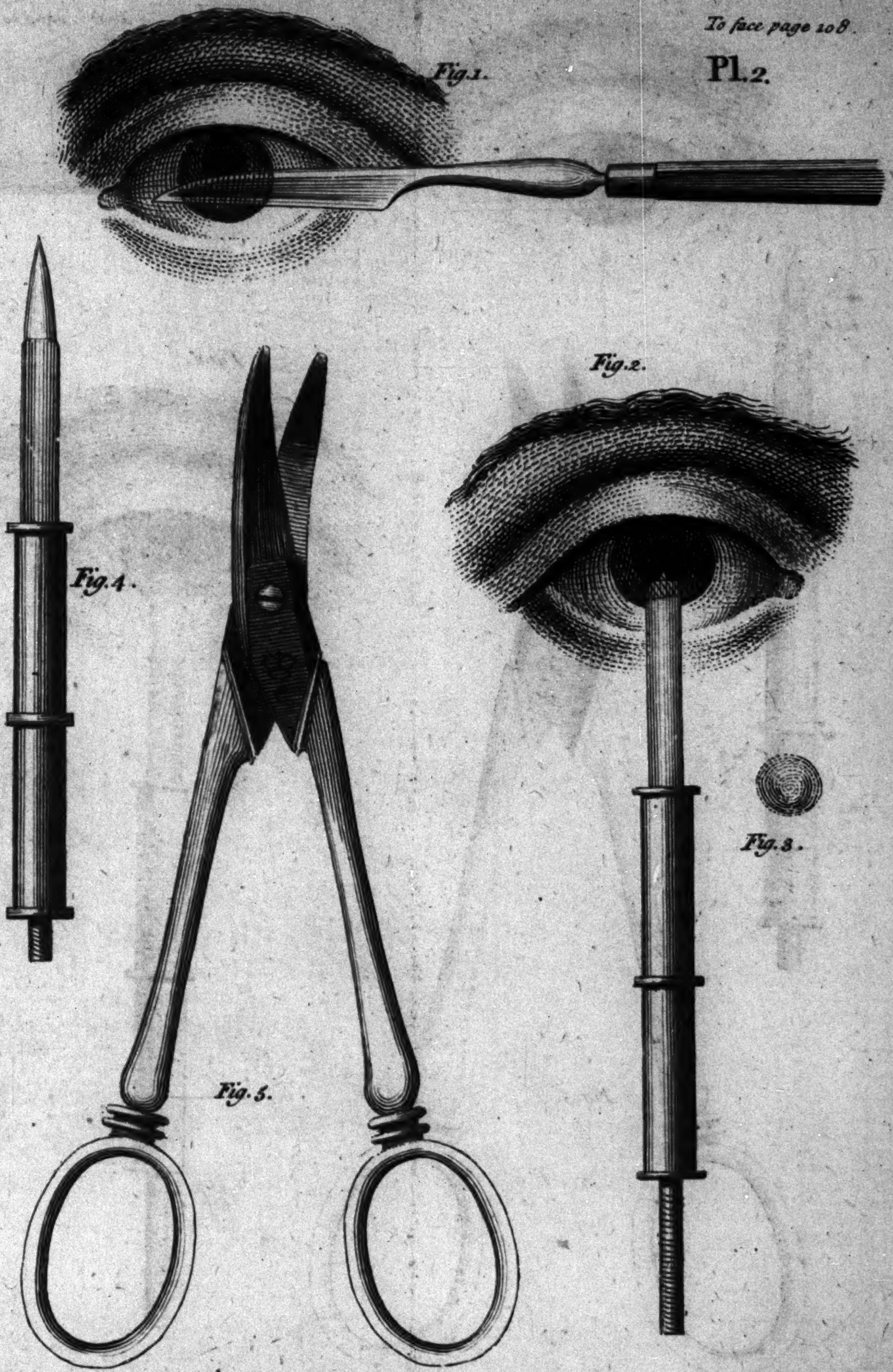

Fig. 1. The Eye with the knife paſsed thrô the Cornea.

Fig. 2. The Eye with the wound on the inferior part of the Cornea, with the Inſtrument paſsed under the Cornea and lying upon the Iris for dividing the Aranea.

Fig. 3. The Cataract.

Fig. 4. The Instrument for dividing the Aranea with the point of the Launcet out of its Case.

Fig. 5. The Curved Sciſsars for enlarging the wound of the Cornea.

There will be very little or no danger of increaſing the pain and inflammation, in purſuing theſe directions; ſince the violence done to the coats of the eye depends upon the firſt proceſs of the operation; and not from the ſubſequent motions of the inſtrument, after it has once been introduced into the poſterior chamber of the eye.

I have often ſucceeded by purſuing this method, in Cataracts that would by no means ſubmit to the firſt, ſecond, or third attempt for depreſſing them: and therefore I take upon me to recommend this mode of practice as adviſeable and neceſſary in many inſtances that will be found to occur in the courſe of buſineſs.

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